The OIL AND GAS JOURNAL

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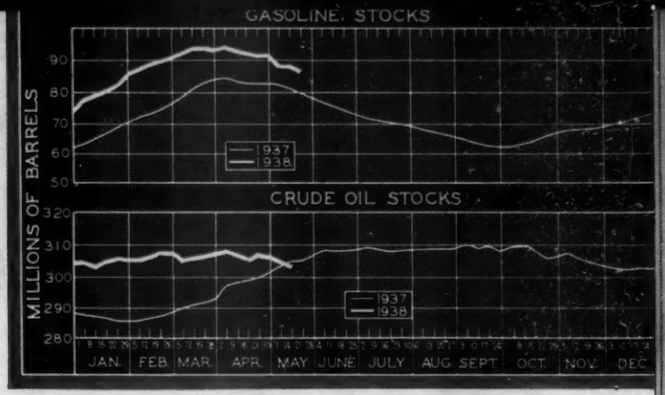


Conditions Show Improvement

THE decline of more than 175,000 barrels daily for the week ending Saturday was the largest drop in over five years and brought supply well within current requirements. The average daily output in the United States was the lowest since February, 1937, and approximately 400,000 barrels daily under the output of the corresponding week of a year ago.

CRUDE PRODUCTION *3,164,283 barrels daily average—down 176,728 barrels.*

CRUDE STOCKS *304,198,000 barrels as of May 14—down 1,550,000 barrels.*

GASOLINE STOCKS *87,992,000 barrels as of May 21—down 655,000 barrels.*

REFINERY RUNS *3,225,000 barrels daily week ending May 21—up 55,000.*

While the bulk of the drop is accounted for by the Saturday shutdown effective in Texas, substantial reductions were also made effective in New Mexico and Kansas. While Oklahoma's output showed a 13,000-barrel decline, the production was still 65,000 barrels daily in excess of the state allowable which was based on the requirements of purchasers for the latter part of the month. It is predicted that some of the large crude buyers will again make pipe line proration effective in the state if the state fails in the curtailment program announced shortly after the first of the month.

In California additional progress is reported in the voluntary efforts to reduce production and a reduction of around 16,000 barrels daily is expected in the Wilmington field which produced over 100,000 barrels daily last week. The immediate objective is a reduction of more than 50,000 barrels daily in the output of the west coast fields.

The large decline in national crude production should bring large withdrawals from crude oil stocks and also aid in quick liquidation of excess gasoline stocks. For the three-week period ending May 16 crude oil stocks declined at the average rate of 165,000 barrels daily. A continuance of the production level effective last week may increase this reduction to around 300,000 barrels daily. It probably will also assure low levels in refinery operations so that more than seasonal withdrawals will become effective.

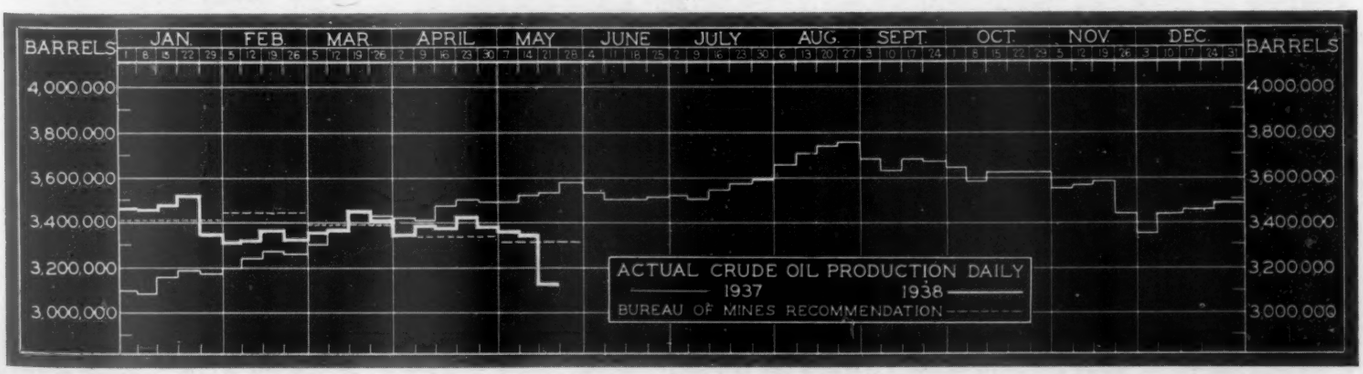
It is improbable that June crude nominations of the buyers will be much larger than they were in May. Reflecting the situation the Texas Railroad Commission whose May program received almost unanimous approval by operators, will continue the Saturday shutdown through June. It is known that requirements of several of the large buyers in Oklahoma and Kansas will be unchanged in June.

The healthier condition in crude oil is reflected in an improved market for refined products. Aided in some degree by jobber buying from the triple holiday attending Memorial Day, the gasoline market is exhibiting rising strength, with predictions of higher tankcar prices.

Daily Average Production for Week

	May 21 1938	Bur. Mines May est.	May state allowables	May 14 1938
Oklahoma City	103,200	.....	.....	122,100
Fitts	48,675	.....	.....	52,875
Remainder of state	319,450	.....	.....	309,675
Total Oklahoma	471,325	510,300	405,000	484,650
East Texas	362,248	.....	.....	425,657
West Texas	177,050	.....	.....	197,873
North Central Texas	101,748	.....	.....	97,961
Texas Panhandle	70,250	.....	.....	61,631
East Central Texas	96,200	.....	.....	101,585
Gulf Coast Texas	295,589	.....	.....	328,776
Southwest Texas	90,550	.....	.....	106,096
Total Texas	1,193,635	1,322,500	1,139,638	1,319,579
North Louisiana	77,095	.....	.....	83,255
Gulf Coast Louisiana	176,600	.....	.....	178,450
Total Louisiana	253,695	243,200	251,450	261,705
California	692,500	667,800	624,735	687,750
Kansas	155,450	168,700	160,000	174,450
Arkansas	42,135	44,500	.....	42,570
Eastern fields	142,500	139,800	.....	147,100
Michigan	53,973	52,600	.....	55,307
New Mexico	93,560	103,900	91,000	103,960
Rocky Mountain area	65,510	64,800	.....	63,940
Total United States	3,164,283	3,318,100	.....	3,341,011

Decrease, 176,728 bbls. daily.



Fight Federal Attempt to Tidelands in California

"From Teapot dome through Elk Hills, and now out into the Pacific Ocean, the fight for oil goes on with increasing fury."

So reads the opening paragraph of the report of the house judiciary committee in support of the resolution claiming title for the federal government to all petroleum reserves under submerged lands off the coast of California. It is an unusual way of beginning a committee report, but the resolution itself and its entire history are also very unusual.

The resolution (S. J. Res. 208) originally was introduced by Senator Gerald P. Nye of North Dakota and passed the senate last August with virtually no explanation and in an air of great mystery. In that form it asserted the title of the United States to all submerged lands and to the petroleum deposits underlying them and would have directed the attorney general to institute proceedings to prevent all persons from removing petroleum from such lands.

The house judiciary committee held a hearing on the resolution last February at which much opposition was expressed, particularly on behalf of Texas, which claims it never surrendered to the United States its title to coastal and submerged lands when it entered the Union. Spokesmen for the navy and other federal departments supported the resolution, but appeared to be unable to produce any very convincing arguments.

It is understood that the resolution was introduced after the State of California denied an application for a permit to drill for oil off the coast and the applicant turned to the department of the interior with the assertion that the lands belonged to the federal government and the state had no authority over them, thus bringing the matter to the attention of the federal government.

The resolution was reported by the house judiciary committee by a vote of 10 to 8, and was accompanied by a vigorous minority report written by Representative John H. Tolan of Oakland, Calif. At the same time, Representative John F. Dockweiler of Los Angeles, Calif., introduced a bill declaring the title to all submerged lands along the coast of California and all petroleum and mineral deposits underlying them rests with the state.

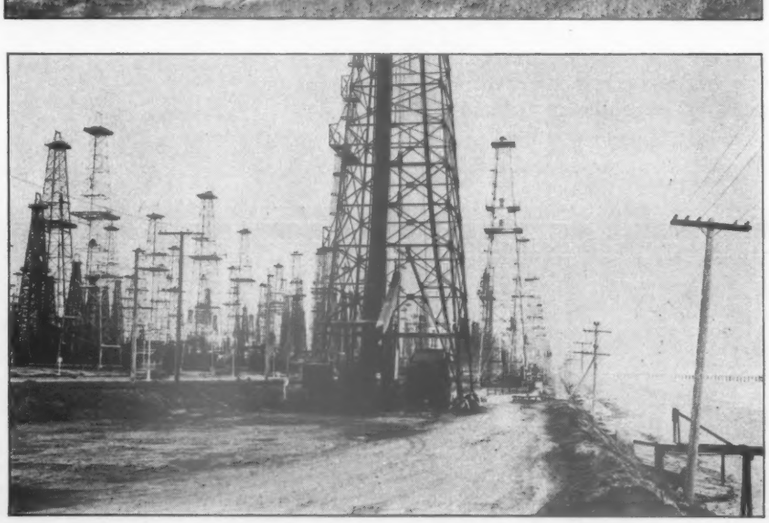
In reporting the Nye resolution the house committee rewrote it entirely, making it apply only to the submerged lands along the coast of California below the low water mark and within the 3-mile limit. It declares the conservation of these petroleum deposits is essential for national defense, maintenance of the navy, and regulation and protection of interstate and foreign commerce and sets them up as a naval petroleum reserve under the control of the secretary of the navy. The attorney general would be directed to bring suit to stop the taking of any petroleum from these submerged lands except by authority of the federal government and to remove all persons and instrumentalities attempting to take any of such petroleum.

The majority report, written by Representative Sam Hobbs of Alabama, declares passage of the resolution is essential to protect the United States from a shortage of petroleum. Pointing out that some 80 companies are now producing petroleum off the California coast, the report declares congress must assert the title of the federal government to these lands to settle the issue between those claiming any rights in this area and the government and that there seems to be no good reason why the courts should not be permitted to decide whether the nation has a paramount right to take and use the oil. It declares the proposed litigation will not involve the issue of the ownership of a vested land title but rather the assertion of a claim of the right to use the oil in these petroleum deposits and an authorization for adjudication of that claim.

Representative Tolan in his minority report asked, "Why should the sovereign State of California be selected to experiment upon, especially in view of the unbroken line of decisions of the U. S. Supreme Court that these submerged lands belong to the state?" He ridiculed the idea that these reserves are necessary for a national emergency or that there is a threatened depletion of oil in the nation. He points out that California, as well as Texas and Louisiana, has for years been granting permits to drill for oil under coastal waters without any question from the federal government until now.

The passage of this sort of legislation, Representative Tolan declares "will do untold harm; will cast a cloud on the title to the ownership of these submerged lands and the improvements thereon. It will affect the title in submerged areas and related port developments owned by the state and its municipal subdivisions. It will throw doubt upon the legality of expenditures of vast sums and frustrate issuance of

Capitan field



Huntington Beach wells bottomed out under ocean

to Seize

By HENRY D. RALPH
Washington, D. C.

and L. P. STOCKMAN
Los Angeles, California

Spence Air photo.

Elwood field from the sea

future harbor bonds. It must not be forgotten that this resolution, aimed at California alone, is only the entering wedge, for in it is the provision that the United States does not waive any of her rights to proceed similarly against other states."

Litigation would be complicated in the extreme because early state records are incomplete and unreliable. The original mean high tide line that defines the boundary of the disputed tidelands has in may cases been obliterated and changed; as accretions due to natural causes and the construction of groins and breakwaters to prevent erosion has changed the action of the tide. Enlargement of harbors, with approval of government agencies, and use of dredging debris to fill in and reclaim partially submerged lands has also changed the original tide line. The courts have sustained the title to California property where the owner has been in unchallenged possession for a period of years.

California operators are giving this proposal serious consideration, with production coming from tideland deposits in the Huntington Beach, Elwood, Rincon, Capitan and Summerland fields and a strong possibility that ultimately similar production will be developed in the Long Beach Harbor section of the Wilmington field. This is not an issue local to California but will ultimately be enforced in the Gulf Coast area and any place where similar production may be developed.

Due to a referendum initiated several months ago, California does not at present have a regulatory tideland statute and will not have one until voted on in November. In the meantime the state is powerless to issue any additional tideland drilling permits although revenues continue to accrue to the state on agreements previously made. Several measures were enacted at the last session of the legislature with respect to future tideland development but two bills enacted conflict in operation. One provides that tideland development should be accomplished by drilling wells on the upland and then bottomed beneath the tideland accumulation by directional drilling, while the other contemplates the erection of groins, wharves or islands.

The state had already asked for bids for additional tideland development in the Huntington Beach field but has been held up by the referendum. In the Wilmington field the state and the city of Long Beach are contesting title to the tideland area in the California courts. The issue is now further complicated by possible federal action and in the meantime operators on the littoral land are draining the tideland accumulation. Some engineers believe the tideland structure in the Long Beach section extends into the water at least a mile.

Producing Tideland Wells

No wells are now being drilled out into the tideland accumulations. Existing agreements provide, however, that when a well that has been completed in a tideland accumulation ceases producing the operator is permitted to undertake the necessary remedial work even to the extent of backing up and redrilling. This provision was inserted so the state might secure maximum production and thus minimize drainage from wells located adjacent to the tide line and producing from the same zone.

A total of 90 wells has been completed in the Huntington Beach tideland area covering roughly 150 acres of submerged land.

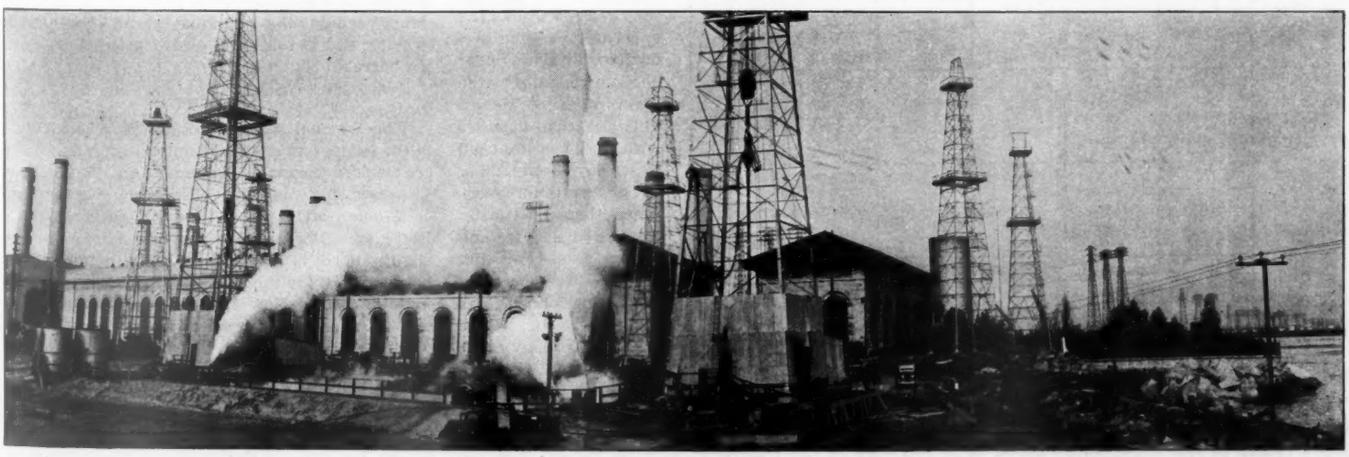
In the Elwood field of Santa Barbara County, 76 oil and gas wells have been completed beneath the tideland structure but no additional wells have been drilled into the submarine zone for several years.

In the Rincon field of Ventura County, 12 wells have been completed in the submarine tideland structure and no further drilling has been undertaken for several years.

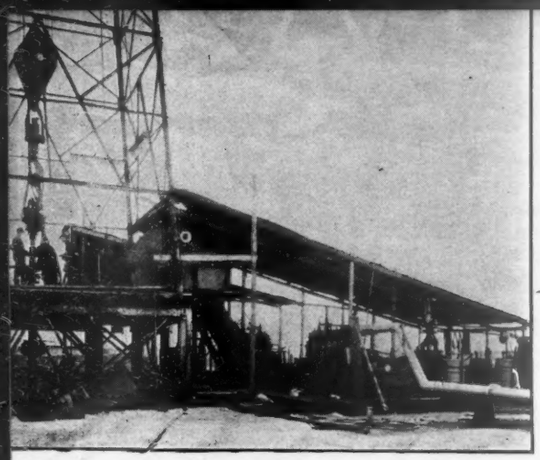
In the Capitan field of Santa Barbara County, two oil wells have been completed beneath the tideland area and no further development is anticipated due to the small production.

California operators with millions of dollars invested in tideland properties are apprehensive about the possibilities of the proposed federal action with respect to tideland properties already proved commercially productive. Operators in the Huntington Beach, Elwood and Rincon fields are desirous of leaving matters as they are with the state in charge of tidelands and the existing agreements validated. Several operators in the Long Beach Harbor section of the Wilmington field on the other hand want the federal government to take charge of the tideland accumulation because they think the federal leasing bill would be more beneficial from a royalty standpoint than either the state's royalty schedule or that charged by the city of Long Beach. A third group consists of those who have already filed applications for drilling permits from the federal government. This group has filed on tidelands claimed by the government but which have already been developed by various operators under leases and agreements with the state and who have been paying royalties to

(Continued on Page 34)



Drilling on Terminal Island, Los Angeles harbor. Southern California Edison Co. steam-electric plant in background



Diesel or steam powered mechanical rotary rigs are used for the 4,600-foot drilling in the Vacuum field

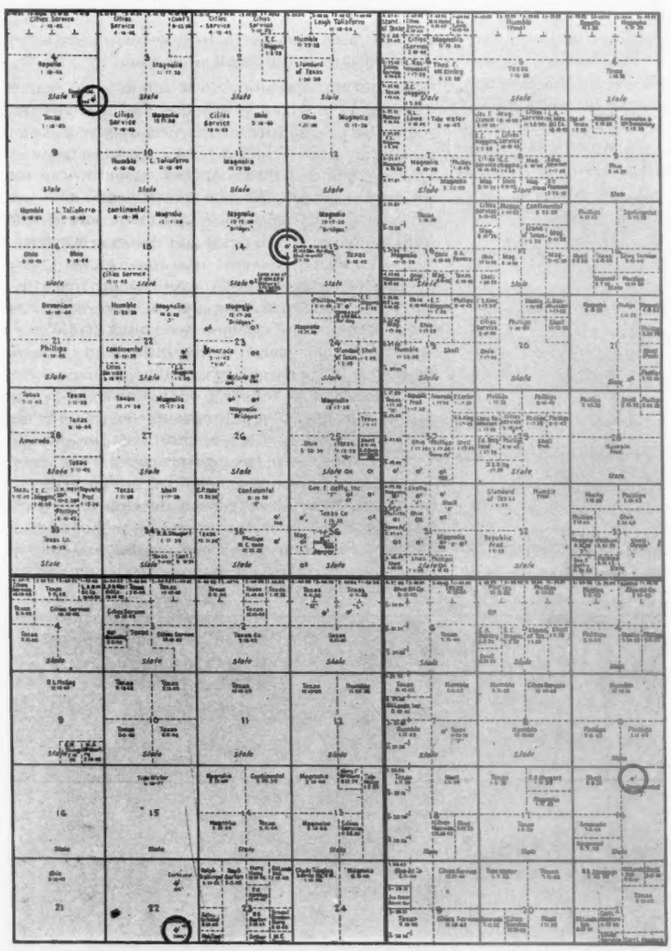
Expanding Vacuum to Be Most Active

By MITCHELL TUCKER

HOBBS, N. M.—The producing area and productivity of the Vacuum field in north central Lea County, New Mexico, has been expanded rapidly since it was "rediscovered" in the latter part of 1937, and has materially added to the reserves of that state. After being provided with its first pipe line outlet on May 1, and in the face of short term leases throughout much of the proven block, the Vacuum pool is scheduled to remain the most active drilling field in New Mexico throughout the year.

The Vacuum Oil Co. (from whom the field obtained its name) drilled the discovery well in July, 1929, on state lands on section line 13-14, Township 17s, Range 34e. The well proved to be a small producer on what now appears to be near the northwestern flank of the structure. Oil saturation in the Permian limestone was cored from 4,563-66 and from 4,606-12 feet. An initial pumping gauge of 120 bbls. daily was established. Magnolia Petroleum Co. later took over the well and Vacuum's holdings. In 1937 they drilled and completed No. 1-G State, three-quarters of a mile southeast of the discovery, for an initial pumping gauge of 268 bbls. per day.

The field received its first representative producer in Magnolia's third well, No. 2 State Bridges, completed in September, 1937, one-half mile to the southwest of the discovery well, which flowed 51 bbls. hourly with 3,000,000 feet of gas. In December, 1937, the Texas Co. stepped out 3½ miles to the south and drilled its No. 1-L State in section 1-18s-34e, which gauged 25 bbls. per hour with 3,000,000 feet of gas. These important extensions, together with the improved initial productions, offered stimulation for the present active drilling campaign. There are now 25 completions in the field, having a daily production of 1,475 bbls. Eighteen wells are drilling at Vacuum at this time.



Zingery Oil Map Co., Fort Worth

Fig. 1—Map of the Vacuum field, Lea County, N. M. Double circled well indicates discovery well; the three outpost wells circled are deep dry holes defining productive limits in their respective directions. Peak of the Vacuum structure is at the axis of the township-range line shown running through middle of the field

The field is unique in that all but 40 acres of the royalty within what appears to be the productive limits is under one ownership, the State of New Mexico This situation, together with the fact that all leases have been held in strong hands for many years, has practically eliminated any trading in the area. For that reason, the Vacuum field's development has not been so closely watched as many other less important fields.

Because of the unified ownership of the royalty in this field, it offers an excellent opportunity to be developed and produced as a unitized project. With the exception of the one 40-acre tract of patented land in section 25 (near what appears to be the center of the field) the pool is completely unitized from the standpoint of the lessors—a condition which was impossible to accomplish at such famous unit control fields as Van, South Burbank, and others. Unitization from the standpoint of the lessees has not been thought necessary in the interests of conservation or efficient operating practices, however, as in the State of New Mexico all operators and the state engineering committee work closely together for the cooperative good of all fields in that state.

Most of the land in this section of Lea County was put under 10-year lease at state land sales in 1928-29. Even though the discovery well was drilled nine years ago, development has been slow until the present time. Almost all leases in about 18 sections of land situated in or near what appears to be the productive extent of the field will expire in the early part of 1939 if not productive. Approximately 50 wells will be required to protect these expiring leases. The Magnolia, Texas, Skelly, Shell, Phillips, Ohio and Getty Oil companies are principal lease holders in the area.

Pipe Line Outlet

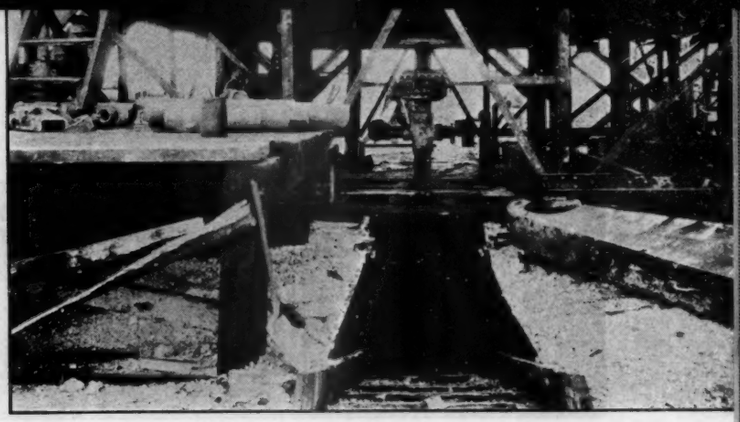
On January 1, 1938, only 7,720 bbls. of oil had been produced from this nine-year-old field. As of April 1 only 38,211 bbls. of oil had been produced. This oil was either used for fuel purposes, trucked out, or stored in a 55,000-bbl. tank on Magnolia Petroleum Co. property.

On May 1, 1938, the field received its first and only pipe line outlet through the completion of Texas-New Mexico Pipe Line Co.'s 8-inch gathering line into the field from its New Mexico system with initial main line pump station at Jal, N. Mex. Its connection into the Vacuum field was made possible through the recent 40-mile line looping from Jal to Monahans, Tex., and the repowering of the line with additional booster stations from that point to the Gulf Coast terminal of the 12-inch main line near Houston. The line's rated capacity out of the Vacuum pool is placed at 20,000 bbls. daily. Vacuum oil is of a mixed-paraffin base, 35-36 gravity, and is sold on a posted price of 98 cents per barrel.

Geology

The Vacuum structure occurs as a local high, in the form of an elongated anticline, on the southern flank of the major Maljamar anticlinal feature. The discovery was made following surface geological studies, and a torsion balance reconnaissance in the area. It is situated about 25 miles west and slightly north of the Hobbs pool. Although it does not lie directly in the path of other limestone fields in southeastern New Mexico, it is thought to be associated with the structural trend along the west platform of the Permian Basin. Production occurs irregularly through a 100 to 125-foot section in the white lime or oolitic portion of the Permian. Parts of the section are very porous and highly saturated. The occurrence of pay is not so uniform as at Hobbs, but appears to be more consistent than at either Monument or Eunice. The deeper produc-

Field Promising in New Mexico



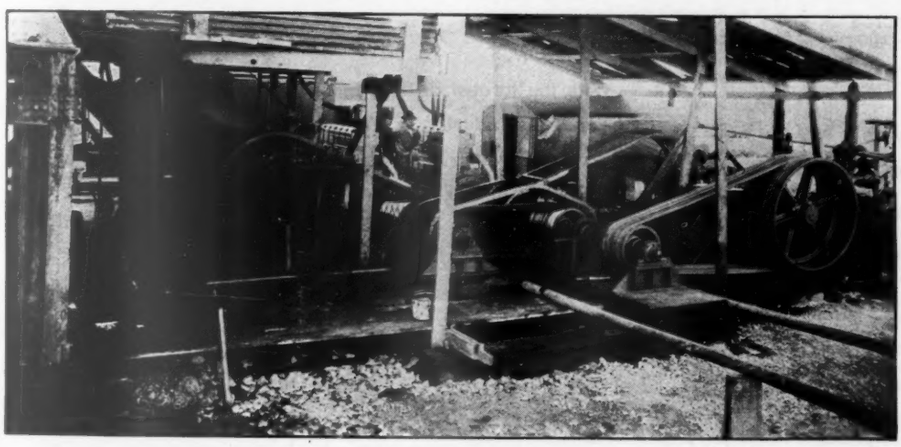
Cellars as well as substructures are used in Vacuum drilling. Master gate is placed in the cellar and blowout preventer above ground level

ing depth at Vacuum, as compared to other New Mexico fields, is due both to an increased elevation and to a regional rise in the beds to the northwest.

A base map of the field is shown in Figure 1. Correlations from present drilling wells on top of the Big lime show that the peak of the structure is just at the axis of the township-range lines. Highest producers in the field are the Texas Co. wells just southeast of this intersection. The field has been defined 4 miles south and slightly west by a dry hole which was 550 feet lower than the high point mentioned. To the southeast 3½ miles, a dry hole 565 feet lower has defined production in that direction. To the north and slightly east about 3½ miles, the discovery well in the field is about 275 feet lower than the structural peak, and a dry hole has been drilled at a considerably lower point 2½ miles farther to the northwest. With the exception of these outposts (all indicated on the accompanying base map, no defining limits have been placed on the possible producing acreage at Vacuum. Ten full sections appear to be proven at this time, and it is not improbable that the field will eventually be proven to twice that area or more. Ultimate recoveries of from 6,000-8,000 and to 10,000 bbls. per acre have been advanced for this field. The Hobbs pool, which is comparable in some respects, has already produced almost 8,000 bbls. per acre to date. An ultimate recovery in the neighborhood of 50,000,000 bbls. may be expected from the Vacuum field as tentatively proven at this time. Probable extensions to the producing area will add to this figure.

The accompanying table sets out comparative data for the Vacuum and other limestone fields in the same area of southeastern New Mexico.

Of the present 89 drilling wells in Lea County, 18 are at Vacuum. No unnecessary drilling is being done in that state at the present time, and all development work is either on short-term leases or on properties which demand offset protection. This is true at Vacuum also, and will probably continue to be the case for the remainder of 1938 at least. However, with the approximate 50 wells required to protect lease expirations up to the early part of 1939, together with the offsets which some of these will force, the development rate at Vacuum can hardly be expected to decrease below the present point.



A diesel-operated drilling rig in the Vacuum field. The two 225-horsepower engines are compounded through V-belt transmissions to the slush pump, drawworks and rotary table

As in all New Mexico fields, drilling is and will continue to be upon a 40-acre pattern. All wells in the field make their top unit allowable of 59 bbls. per day.

With an average bottom-hole pressure of about 1,535 pounds, all but three wells flow their daily allowable. The first two wells drilled on the northwestern flank of the field are pumped, and one well is producing by the aid of flow valves. The evidence of some free hydrogen sulfide gas indicates that corrosive problems similar to those in other fields in that area will be encountered.

Only in the few wells drilled near the peak of the structure has an appreciable amount of free gas been obtained. Ratios in other wells have declined rapidly after completion, and some wells produce only gas in solution with the oil. The two first wells in the field drilled into sulfur water, and plugged back. The water table was thus early established, and all subsequent wells have been completed above that subsea point.

Drilling Conditions

Wells to the 4,600-foot level are drilled in from 25 to 35 days with rotary tools. Two casing patterns have been used in the field:

	First pattern (ins.)	Second pattern (ins.)
Surface string, 250 ft.	13	10
Intermediate string, 1,300-1,600 ft.	10¾	7⅝
Oil string, set in top of Big lime	7	5½

It is expected that the intermediate string of pipe which is set at the base of the salt section will be discontinued in future drilling. This will require that a close check be maintained on the condition of drilling mud through and below the salt. The running of this intermediate string has necessitated that cellars be dug, in addition to the use of substructures, in order to provide room for master gate, blowout preventer, and other necessary well-head connections below the derrick floor

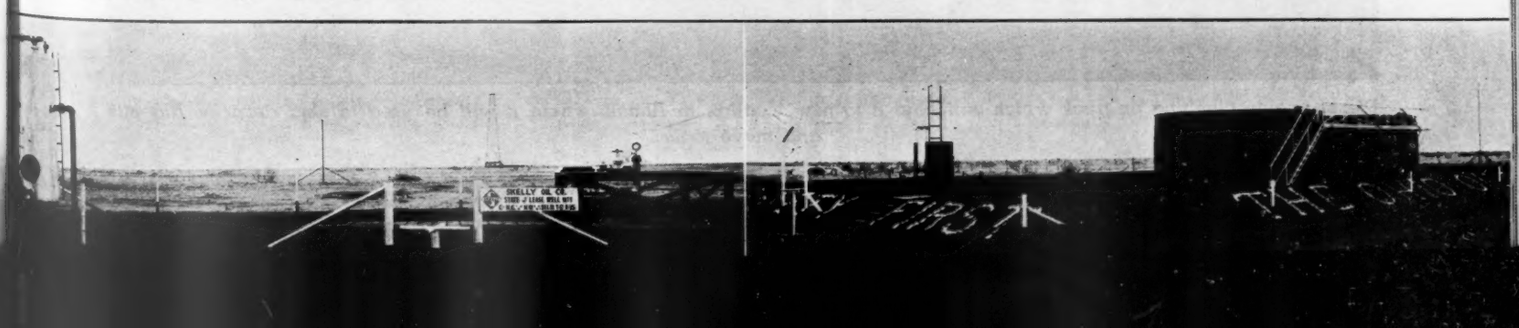
The oil string is set high in the section, in certain cases leaving as much as 500 feet of open hole exposed, in order to permit entrance of any upper gas into the well bore to assist as a lifting agent for the oil. It is the conventional practice to drill-in under pressure, using oil as a circulating medium. A few of the wells that did not make satisfactory initial productions have been acidized to materially increase their yields. Acidization for most of the field will be delayed until its later life, as potentials do not enter into the granting of allowables in New Mexico.

COMPARATIVE DATA ON LIMESTONE FIELDS OF NEW MEXICO

	Vacuum	Hobbs	Eunice	Monument	Cooper	Jal
Total producers	25	265	480	490	90	32
Productive acres	*6,600	10,500	18,000	19,600	3,600	1,200
Accumulated production to 5-1-38 (bbls.)	70,000	83,000,000	28,000,000	19,000,000	8,500,000	5,645,000
Yield per acre to 5-1-38	10	7,800	1,555	1,000	2,360	4,500
Average depth	4,600	4,050	3,850	3,900	3,550	3,350
Average elevation	4,000	3,600	3,550	3,700	3,380	3,370
Average gas-oil ratios	(†)	2,175	4,300	2,700	6,800	9,000
Present average bottom-hole pressure (lbs.)	1,535	1,190	1,250	1,340	.....	.....

*Estimated from early control.
†Only two wells on peak of structure have indicated any appreciable amount of free gas. Solution gas is all produced from other wells.

Wellhead hookup and low-pressure separator in the Vacuum pool. Tank battery in the Vacuum area of Lea County, New Mexico



SPARKS FROM THE NEWS

WILDCAT WEEK

It was wildcat week in Oklahoma and Kansas, with four tests in the former state and five in the latter pointing to new fields. The favorable showings are scattered in seven counties of the two states.

PROMISE AND PERFORMANCE

There is a wide discrepancy between Oklahoma's actual production and the state's allowable. A return to pipe line proration will result if this situation is ignored.

"REDISCOVERED" ACTIVITY

The "rediscovered" Vacuum field probably will be New Mexico's most active drilling area over the remainder of the year.

REFINERY PROGRESS

New units and the rebuilding of existing plants are constantly strengthening the Texas Gulf's refinery position as the largest world supplier of petroleum products.

FAIR RECORD

South Illinois' 428 new wells are averaging 72 barrels daily each, a fair record for an area which brought in its first large producer less than a year ago.

A LA UNITED STATES

The congressional proposal to take over submerged coastal lands belonging to the states as oil reserves, is a form of expropriation a la United States.

HEALTHY BUSINESS

The ages of old timers participating in the International Petroleum Exposition contest indicate that oil is at least a healthy business to be in.

LIQUIDATION

With the largest decline in daily crude oil production in five years the industry is now in a position quickly to liquidate excess inventories accumulated early this year and in the latter part of 1937.

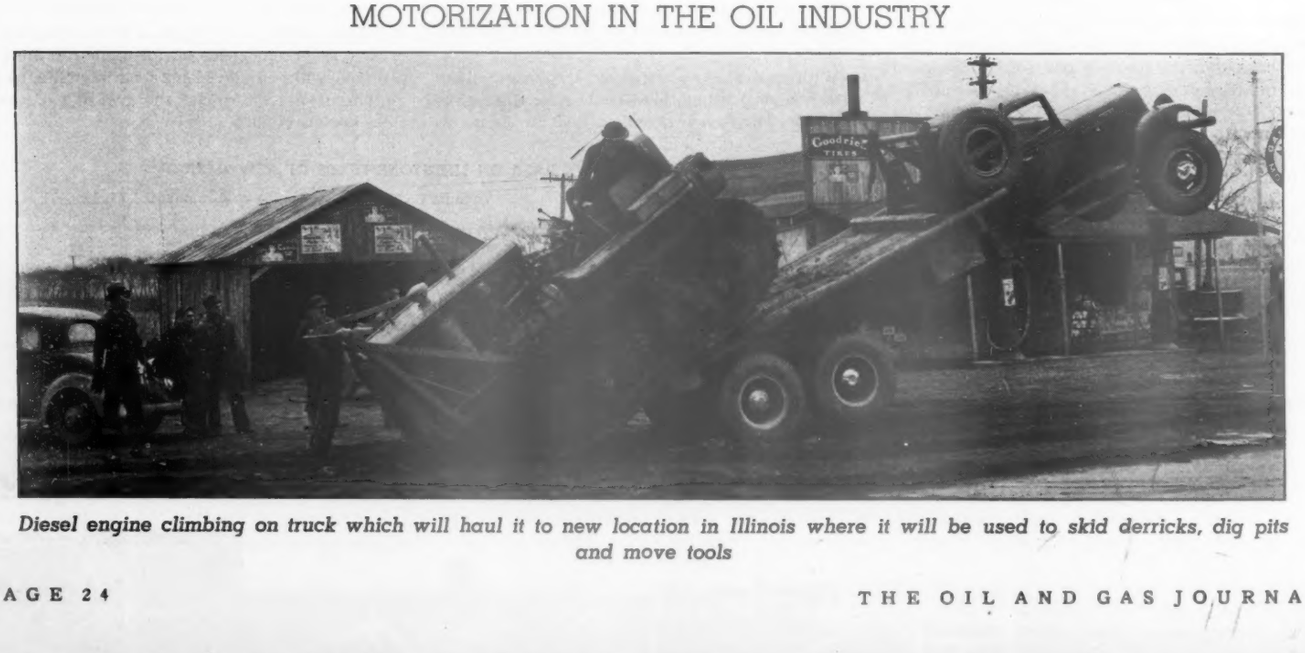
CREEPING UP

With a production of nearly 45,000 barrels daily, Illinois passed Arkansas last week and shortly should catch up with Michigan.

THE PROOF

If you doubt that the oil business is going scientific look over the A.P.I.'s midyear program this week at Wichita, with papers on engineering subjects predominating and technical committees meeting all day and most of the night.

MOTORIZATION IN THE OIL INDUSTRY



Diesel engine climbing on truck which will haul it to new location in Illinois where it will be used to skid derricks, dig pits and move tools

Byles Tells Institute Technical Progress Justifies Confidence

M. L. HAIDER

By W. T. ZIEGENHAIN
Engineering Editor

and L. G. E. BIGNELL
Production Engineering Editor

WICHITA, Kans., May 24.—Finding the answer to riddles is nothing new for the oil industry, Axtell J. Byles, president of the American Petroleum Institute, declared at a press conference in connection with the Institute's eighth midyear meeting, which opened here yesterday. So, said Mr. Byles, the current business recession is just another problem, to which the industry is adjusting itself, attended by more encouraging conditions than face some other lines.

The three-day meeting is devoted to technical papers and discussions, and W. R. Boyd, Jr., executive vice president of the Institute, told the conference how the annual midyear programs have focused the trained intelligence of the industry upon its scientific problems.

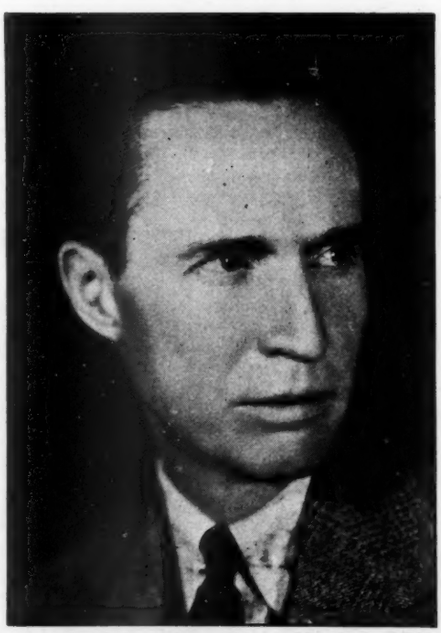
Registrations for the meeting, which is using accommodations of the Allis and Lassen hotels, have been surprisingly high and are expected to total about 700. Committee meetings, which began last Saturday, are featured by interesting reports and new developments.

"An industry which is called upon to produce, transport, and refine between 3 and 3½ million barrels of petroleum daily and to place the products in the hands of consumers cannot abruptly change direction or lose momentum," Mr. Byles told his hearers. "However, this industry is accustomed to sudden changes. A business recession is just another problem to the petroleum industry, which has been solving difficult problems ever since its inception, and it gradually is adjusting itself. This cannot be accomplished overnight.

"The current decline was apparent as early as last July, and the industry, much as it hoped the storm flags would fly only temporarily, was not wholly unprepared. It is still hopeful that the adverse influences, both economic and artificial, soon will be altered so that all business may enjoy a feeling of security and again normally may render that service to the public for which it exists. And since most of us earn our livings from business, that favorable development should be a public hope.

"Fortunately for the people of the oil-producing states, this industry's principal income product, motor fuel, is in universal demand, and the industry therefore is able to pursue a course steadier than that of many industries between the peaks and valleys of depression. Typical of its good fortune is the fact that domestic demand for motor fuel in the first quarter of 1938 averaged about 2 per cent above that for the first quarter of 1937. Export demand was up about one-third. Thus the industry was able to market roundly 4 per cent more gasoline during the first three months of 1938 than it did in the corresponding period of 1937. The increase in sales benefited not only the industry, but greatly augmented the income of state and federal treasuries, which, through retail sales taxes, now realize a greater net profit than the industry itself on the marketing of motor fuel.

"While gasoline demand in April appears to have tapered off a bit, it does show a gain over that of April, 1937. Reasonably good weather over a large section of the country and the approach of the touring and vacation periods probably will help to reduce the industry's gasoline inventories, which are and have been at uneconomically high levels for many months.



HOST: *J. A. Vickers, Wichita, who entertained A.P.I. visitors*

E. O. BENNETT

"Progress toward the liquidation of the surplus has commenced through decreased runs to stills and through decreased crude production allowables. Continuation of this policy, for some time, is necessary to cure the ills resulting from earlier over-optimism.

"The industry is particularly fortunate in that factors and influences for the current decline are known to its people and much is being done to remedy this situation. There may be isolated difficulties, such as the intensified competition for markets between the Oklahoma-Kansas and the Illinois-Michigan producing areas, brought about by the shifting of previously established channels of trade dictated by the savings in relative pipe line transportation rates.

"In fact, one has only to study the progress of the petroleum industry in solving the most difficult problems, both economic and the technical, as reflected in reports to be made at the Institute's eighth mid-year meeting in Wichita, to gain a feeling of confidence in this industry's demonstrated ability to solve its problems. Technical knowledge gives us every assurance of a continuity and adequacy of supply of petroleum and the production of constantly improved products at reasonable price levels. Application to current difficulties of the same energy and intelligence which solved earlier problems will bring about an equally effective solution of the new."

Discussions at the group sessions and commit-

L. E. HEBL *H. L. BEDELL* *R. J. GREENSHIELDS* *H. B. WELLMAN*

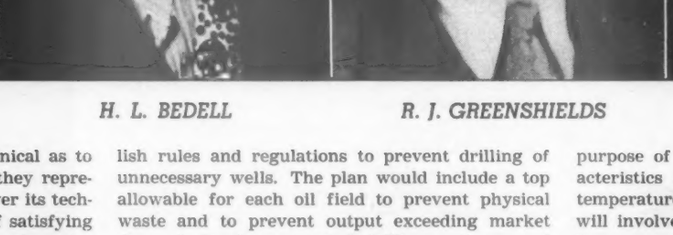
tee meetings may seem so deeply technical as to be unintelligible to the lay mind, but they represent efforts of the oil industry to discover its technological needs and to devise means of satisfying them, Mr. Boyd said in explaining the character of the mid-year meeting at the press conference.

"These meetings," Mr. Boyd went on, "serve not only to permit the industry's technologists to exchange technical data, but to indicate to the American people what the future holds in the way of assurance of an adequacy in the supply of petroleum products and in the efficiency of petroleum industry service. Among the accomplishments have been development of new equipment and standardization of old; improvements in old methods and practices, with origination of new; organization of tests to promote manufacture and use of efficient and safe materials; and preparation and dissemination of specifications, recommended practices, and statistical data.

"While, upon occasion, the oil industry has sought the cooperation of government to exercise jurisdiction which the industry itself lacked, this industry has made it a habit to stand upon its own feet and to fight its own battles. However, it faces two current problems which occupy fields somewhat outside the industry's scope. One is a trend toward unnecessary governmental interference and the invasion of industrial activities by political domination. The other is growing taxation. In seeking the solution of these two problems the petroleum industry must ask the sympathetic understanding and support of the public, because the one threatens seriously to curtail the efficiency of the industry's operations and services, and the other so greatly to increase retail prices as to inconvenience the public and to discourage consumption."

Unnecessary Drilling

Two reports concerned with the legal and engineering phases of the problem of reducing unnecessary drilling were presented to the Institute's board of directors by George A. Hill, Jr., Houston Oil Co., Houston, Tex. The engineering report recommended that, after the maximum rate of a pool's production had been determined, an allocation unit sufficiently large to prevent the compulsory drilling of unnecessary wells be adopted. The legal subcommittee report suggests that the regulatory agencies of oil producing states establish rules and regulations to prevent drilling of unnecessary wells. The plan would include a top allowable for each oil field to prevent physical waste and to prevent output exceeding market demand. It also suggested drilling patterns and the establishment of proration units for all fields to allocate production so each operator may obtain his fair share of the recoverable oil and gas.



A.P.I. registration makes record at Wichita

These reports will be studied and acted upon later by the board. The recommendations were supported in a prepared statement by Robert E. Hardwicke of Fort Worth, Tex., leader in the efforts to curtail unnecessary drilling. He contends the state regulatory bodies have authority at this time to enforce needed well spacing programs.

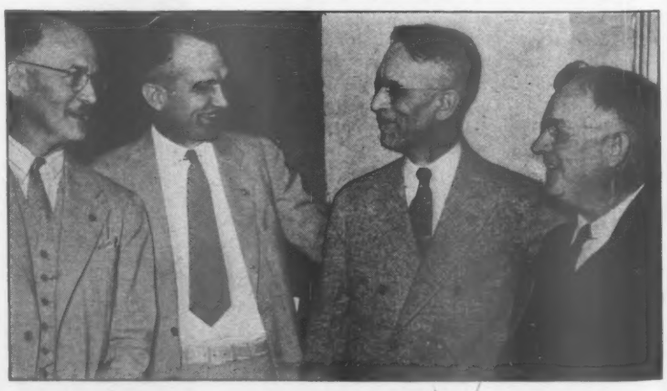
The board of directors adopted a resolution on the death of K. R. Kingsbury, vice president of the Institute and president of Standard Oil Co. of California.

The board also approved a resolution presented by the general committee of the division of refining urging support of a research program at Ohio State University. The program calls for the preparation of pure gasoline hydrocarbons for the purpose of determining engine combustion characteristics such as octane number, spontaneous temperature and rate of flame propagation. It will involve expenditure of $18,000 yearly over a four-year period and will be financed by 15 companies.

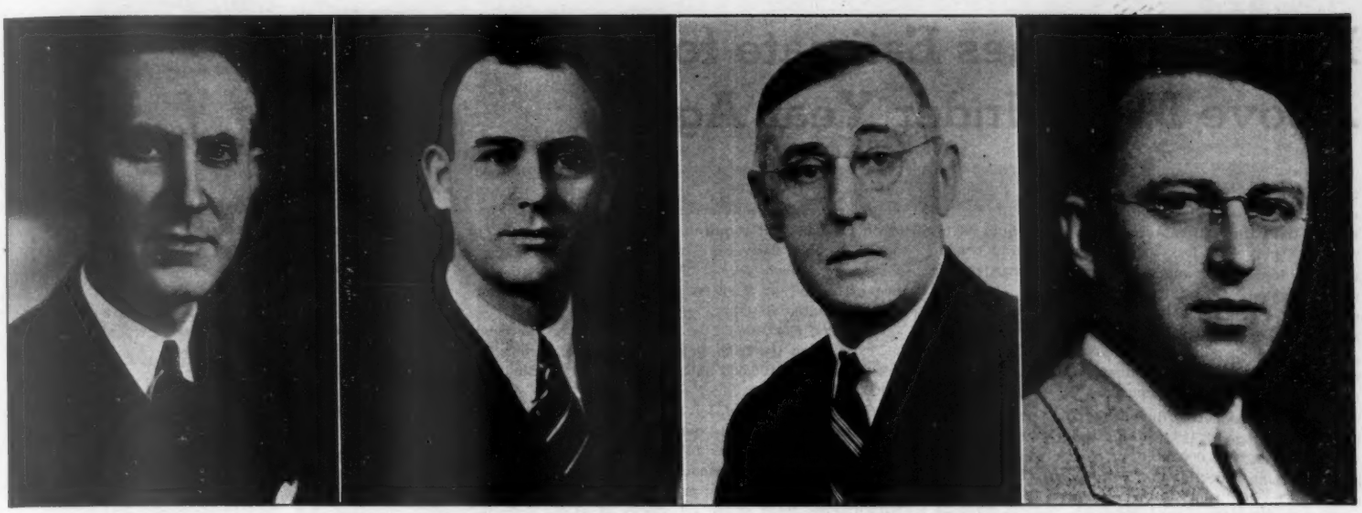
The topical committee on production technology heard reports of several subcommittees Monday afternoon and renamed one committee on coring analysis and electrical logging. The subcommittee on fundamental sampling, transportation and analysis of subsurface samples of crude oil made a report and was instructed to prepare papers on application of the methods suggested, such as use of back pressure, determination of gasoline content of gas in place, and the definition of an oil and gas well where hydrocarbons may exist in vapor phase underground.

Eight technical group sessions were scheduled and 60 committee meetings, which began Saturday. The Institute's board of directors were dinner guests Tuesday evening of J. A. Vickers, of Vickers Petroleum Co., Wichita, at the Allis. Wichita oil and supply companies are hosts Wednesday night at a buffet dinner for all attending the meeting. The Division of Production golf tournament was set for Thursday at the Wichita Country Club, with the golf banquet closing the program at night.

How the industry has endeavored to solve the



G. V. N. Yates, I.T.I.O., Tulsa; F. A. Stevers, Texas Empire Pipe Line Co., Tulsa; D. R. Weidner, Sinclair Refining Co., Independence, Kans., and L. E. Barrows, Texas Co., Houston, Tex.



ARTHUR M. BRERETON *WALTER F. ROGERS* *C. C. SCHARPENBERG* *BRUCE K. BROWN*

problem of stream pollution by refineries through the cooperation of Institute committees, and the development of an efficient model separator through Institute financing, was told before the morning session of the Division of Refining by W. B. Hart, Atlantic Refining Co., Philadelphia, Pa. The device, developed during 10 years of research, utilizes sedimentation phenomena to prevent waste oil flowing from refineries into streams and can be built and operated at such moderate costs as to make installations generally advisable.

In a discussion on the removal of hydrogen sulfide from refinery gases G. M. Carvlin, Koppers Co., Pittsburgh, Pa., describing the Koppers phenolate process, said the purification operation not only prevents corrosion of equipment and pollution of the atmosphere but makes possible the recovery in practically pure form of hydrogen sulfide, from which 66-degree Baume sulfuric acid can be made at an operating cost of only $3.25 per ton. (Page 56, this issue.)

Other purification processes in use, and their operation, were discussed by T. W. Rosebaugh, Shell Development Co., San Francisco, and by Hans Baehr, I.G. Farbenindustrie A.G., Ludwigshafen am Rhein, Germany.

W. R. Wood and B. D. Storrs, Girdler Corp., Louisville, Ky., discussed the Girbotol purification process. They cited as additional uses recovery of carbon dioxide in dry-ice plants, recovery of hydrogen sulfide, purification of gas-engine fuel, and the production in inert atmospheres. (See Page 47.)

The profit possibilities in conserving the gravity of crude in production, transportation, and handling—estimated at close to $50,000 daily in the Mid-Continent area alone—were reported by S. F. Mauney, Jr., Carter Oil Co., Seminole, Okla., and George M. Vandaveer, Jr., of E. H. Moore, Inc., Tulsa, before the Division of Production, (Page 74, this issue).

Technical details of proper perforation of screen pipe were discussed by J. M. Cunningham, Gulf Research & Development Co., Harmarville, Pa., and experiments with the design and operation of oil-well screens were described by R. L. Chenault, of the same organization.

"Unrecoverable" petroleum can be brought to the surface in amounts that will add 40 per cent to the production according to a report on new engineering methods presented by E. O. Bennett, chief petroleum engineer, Continental Oil Co.

The increased production is promised by "pressure maintenance," described by Bennett as "one of the most discussed but least practiced of any type of operation in the oil industry." It is a method of holding the original underground pressure in a producing zone at its initial value or as close to that value as possible by compressing the natural gas from the pool and forcing it back into the underground formation through special input wells. In some cases oil may be produced and gas returned through the same well.

The Division of Refining learned, through a report prepared by the combined staffs of Shell Development Co., and Shell Chemical Co., both of San Francisco, Calif., that the catalytic hydrogenation of octenes to octanes produces high-octane fuels low in acid-heat number and ideally suited for the manufacture of high-octane aviation gasoline. (Page 50, this issue.)

The Division of Refining, considering the problem of developing motor fuels which will eliminate or minimize knocking tendencies, was informed by R. J. Greenshields, L. E. Hebl, and T. B. Rendel, all of Shell Petroleum Corp., Wood River, Ill., that definite information is beginning to clear. Coordinated data obtained from tests made over the past six years with more than 500 different cars has indicated little change in the antiknock requirements of cars since 1932. Only about 10 per cent of present vehicles require fuel of 78 octane, or higher, while 60 per cent require 70 octane, or less, fuel, and about 30 per cent will not knock on 65-octane gasoline.

"Apparently it is rather paradoxical, for it seems to be that 'the octane-number requirement of a car is to a very large extent a reflection of the octane-number level of the fuels supplied to that car'."

Stating that the importance of the problem of knock at full throttle is becoming less important than that of knock at part-throttle, the authors explained that automotive designers, in seeking to avoid knock at part-throttle, have retarded the spark to suit the antiknock level of fuels generally

(Continued on Page 36)

C. O. RHYS *J. M. CUNNINGHAM* *R. L. CHENAULT* *S. T. SIKES, JR.*

Bureau of Mines Estimate for June Above May, Under Year Ago

The daily average supply of domestic crude oil estimated by the Bureau of Mines to meet the market demand in June is 3,333,300 bbls. This is 15,200 bbls. higher than the estimate for May, 1938, but 193,800 bbls. (5.5 per cent) less than the actual daily production for June, 1937, and 5 per cent less than the demand for domestic crude for that month. The reduction, compared with last year, is due to the necessary liquidation of surplus refined stocks, particularly of gasoline, as well as to further evidence of a sharp decline in the demand for residual fuel oils, particularly notable in the California market.

Crude oil production during the four weeks April 9 to May 7 averaged 3,413,000 bbls. daily. Stocks declined 1,808,000 bbls., 456,000 bbls. of which was in foreign stocks, leaving a decline of 1,352,000 bbls. for domestic grades. The addition of this amount to production gives 3,461,000 bbls. as the apparent daily average demand for domestic crude. Daily average crude runs to stills were 3,149,000 bbls., or approximately the quantity estimated for both domestic and foreign crude in the April forecast. Consequently the unexpected demand for almost 100,000 bbls. daily must be attributed either to abnormal exports, transfers, losses, or to an increase in stocks of heavy crude in California.

ESTIMATED DAILY AVERAGE CRUDE OIL DEMAND BY STATES

(As no changes in crude-oil stocks are involved in these estimates, they represent demand rather than production)

State—	Forecast June, 1938	Forecast May, 1938	Actual production Mar., 1938
Texas	1,329,300	1,322,500	1,339,200
California	650,000	667,800	723,900
Oklahoma	508,300	510,300	525,700
Louisiana	250,000	243,200	258,500
Kansas	172,300	168,700	170,700
New Mexico	108,300	103,900	101,900
Michigan	54,000	52,600	52,000
Pennsylvania	53,400	51,400	53,300
Wyoming	49,700	47,400	48,400
Arkansas	48,300	44,500	50,400
Illinois	41,700	39,700	42,900
New York	14,700	14,200	14,700
Kentucky	14,000	13,900	14,800
Montana	12,700	12,600	13,200
West Virginia	10,500	10,000	10,900
Ohio	8,800	8,300	9,700
Colorado	5,000	4,800	3,700
Indiana	2,300	2,300	2,400
Total	3,333,300	3,318,100	3,436,300

Motor Fuel

Domestic Demand.—The estimate for domestic motor fuel demand for June is 48,100,000 bbls., or 1 per cent lower than actual demand for June, 1937.

Exports.—Motor fuel exports, based upon returns by exporters, have been estimated as 3,400,000 bbls., or 300,000 bbls. higher than the estimate for May, and 315,000 bbls. higher than actual exports for June, 1937.

Stocks.—Stocks of finished and unfinished gasoline amounted to 92,320,000 bbls. on March 31. According to the American Petroleum Institute, these stocks declined 1,843,000 bbls. during April, bringing them to approximately 90,500,000 bbls. on April 30. The heavy shipments in June in anticipation of summer gasoline demand will enable refiners to reduce their stocks materially if crude runs to stills are kept at a low figure. Accordingly, the bureau estimates gasoline stocks will decline 6,550,000 bbls. in June, compared with an actual decline of 4,660,000 bbls. in June, 1937.

Gasoline Production.—Benzol and "direct" sales and losses of natural gasoline have been estimated as 950,000 bbls., making the estimated production of gasoline 44,000,000 bbls. This is distributed among the various districts as follows (thousands of barrels): East Coast, 6,310; Appalachian, 1,510; Indiana-Illinois, 7,830; Oklahoma, 2,110; Kansas-Missouri, 2,360; Inland Texas, 3,540; Texas Gulf Coast, 11,060; Louisiana Gulf Coast, 1,380; North Louisiana-Arkansas, 940; Rocky Mountain, 1,090; California, 5,870.

Crude Petroleum

Runs to Stills.—Natural gasoline consumption at refineries in June is estimated as 5.8 per cent of the total gasoline required, or 2,560,000 bbls. The yield of straightrun and cracked gasoline is estimated as 44 per cent, compared with 43.5 per cent for June, 1937. Application of this yield to the estimated straightrun and cracked gasoline production of 41,440,000 bbls. gives refinery crude oil requirements as 94,100,000 bbls., or 3,136,700 bbls. daily.

Foreign Crude Runs.—Foreign crude runs to stills are estimated at 2,200,000 bbls., 100,000 bbls. more than estimated for May.

Exports, Fuel, and Losses.—The estimate for crude oil exports on the basis of returns from exporters has been decreased 100,000 bbls. from the May estimate to 6,000,000 bbls.

Crude Oil Demand by States.—The breakdown of the total estimated daily demand for domestic crude of 3,333,300 bbls. gives the following market demand by states of origin. As demand may be supplied either from stocks or from new production, any contemplated withdrawals from crude oil stocks must be deducted from the bureau's estimate of demand to determine the amount of new crude to be produced.

Increase in Registration of New York Motor Vehicles

Reports that New York gasoline consumption was disappointing in the first quarter are inconsistent with the trend of motor vehicle registrations.

The Motor Vehicle Department at Albany reported last week that 2,071,822 cars and trucks were licensed in the first three months of 1938, a rise of 61,069 units over the same period in 1937. Revenue paid the state in registration fees amounted to $38,896,763, an increase of $1,021,744 compared to last year.

Shell Petroleum Corporation Advances Erichsen and Hall

Appointment of R. H. Erichsen as general sales manager and H. E. Hall as assistant general sales manager is announced at St. Louis by P. E. Lakin, vice president in charge of marketing, Shell Petroleum Corp.

Mr. Erichsen joined Shell five years ago as division manager when Arrow Oil Corp. of Kansas City, Mo., of which he was president, was purchased by Shell. Born in Minneapolis 41 years ago, he entered the oil industry in 1920 at Kansas City. Two years later he formed Petroleum Oils Corp., and in 1927 established Arrow Oil Corp., who became exclusive distributors of Shell products the following year.

R. H. ERICHSEN

Mr. Hall, prior to his promotion, was manager of the northern area, to which he advanced after having been manager of the service station department for four years. Joining the corporation in 1926 as lubrication engineer, he was appointed lubrication manager of the northern division the following year. Thereafter he advanced to head office manager of lubrication, then to division manager, from which he was advanced to service station manager.

Field supervision of Shell's nine division and two tankcar district offices, formerly directed from the Shell head office in St. Louis by four area managers has been consolidated under the newly created office of general sales manager.

Internal Revenue Bureau Ruling On Social Security Taxes

The Bureau of Internal Revenue has ruled that the manager of a bulk oil plant is an employe of the company owning the plant and the company must pay social security taxes on him, and on all employes hired by the manager with the express or implied consent of the company. In the case selected the manager was the exclusive agent for the company for distribution and sale of its products in a prescribed territory from a bulk plant owned by the company. He was required to devote his full business time and best efforts to the performance of his duties for the company and was prohibited from engaging directly or indirectly in any other occupation. All sales were made pursuant to written contracts between the companies and the customers and the manager was not allowed to extend credit beyond the limit placed by the company. He was also required to make certain reports and to perform certain other duties for the company, and the bureau ruled he was so under the control of the company his relationship with it was that of an employe.

In order to facilitate rulings on doubtful cases involving the question of whether sales agents are employes for purposes of social security taxes, the Bureau of Internal Revenue has issued a lengthy questionnaire which revenue agents are to have firms fill out and submit to the bureau. The questionnaire contains 30 main questions, several having many subdivisions, covering all aspects of a sales agent's relationship with his principal, such as method of compensation, reports submitted, and duties required.

Two Wilcox Oil Pools, One Gas Field Opened in Oklahoma

W. A. Delaney and others No. 1 Bugher, SE SE SW section 12-7-2w, which opened a new Wilcox sand pool near Noble, in Cleveland County, Oklahoma, flowed 1,179 bbls. of oil and 286 bbls. of water through casing and tubing in 12 hours and was shut in for tankage.

Texas Co. No. 1 Longan, C W half NW NW section 12-17-1e, pool opener near Goodnight, Payne County, Oklahoma, flowed 525 bbls. of high gravity oil from first Wilcox sand in 13 hours on initial tests early this week. There was no water showing. It was shut in for connections.

Gilbreath & Dutton No. 1 Wolfe, C SE SW section 8-1n-2e, opened a new gas pool in Murray County, Oklahoma, when it blew in Monday after perforating casing at 2,227-86 feet. Gas production was estimated at 15,000,000 feet daily. This gives Murray County its first pool.

Independent Operators Discuss Borah Pipe Line Amendment

Independent oil producers of Oklahoma and Kansas are discussing action regarding the Borah amendment to the Gillette bill now in congress which seeks to divorce pipe lines from the other operations of integrated companies.

The OIL AND GAS JOURNAL

PRODUCING REFINING NATURAL GASOLINE PIPE LINE

Published weekly by The Petroleum Publishing Company at Tulsa, Oklahoma

Mysterious

There has been considerable mystery attached to the proposal that the federal government take title to petroleum reserves of submerged coastal lands ever since the Nye resolution was introduced in the senate last August.

Governmental sponsors have never made clear on what basis they justified this unprecedented action or what they expected to accomplish if their plan should be approved by congress and the courts.

There is a strong suspicion that the whole program was inaugurated with the hope that it will result in concessions from the coastal oil states to the federal government to which it is not entitled.

The present resolution as it has been approved by the house judiciary committee is confined to coastal lands in California but the right to bring similar action against other states is not waived.

The supporters of the resolution at the committee hearing and elsewhere have seen fit to ignore the legal question involved, despite the fact that the great mass of the court decisions have held that the submerged lands along the coast of the United States belong to the adjoining states.

Is this resolution an attempt to establish an entirely new legal concept in regard to state sovereignty, involving further encroachment upon rights clearly reserved to the states in the past if the courts reverse their previous decisions and uphold the federal government in this claim?

If such a legal construction can be sustained it reasonably must be concluded that the federal government can go still further and establish petroleum reserves wherever it sees fit, a step not far removed from absolute federal control of the industry on the plea of national defense.

Not only the rights of the states but the rights of the private operators are at stake. In California private operators spent millions before they were able to discover oil in the tidelands. The development of these tidelands was the result of an extended period of exploratory work by these operators, particularly difficult because these producing areas were submerged.

For the federal government arbitrarily to seize these lands which private operators have explored would be a form of expropriation which loses none of its objectionable features because it happens to be within the confines of the United States rather than in some foreign country.

To set up a large unexplored area as a naval reserve simply by assuming that oil can be obtained therefrom in case of national emergency verges on the ridiculous.

The only petroleum reserves of any value to the country are those that have been established by the drill. The only proved reserves on the tidelands of California are those that have been discovered by private operators and only partially produced at this time.

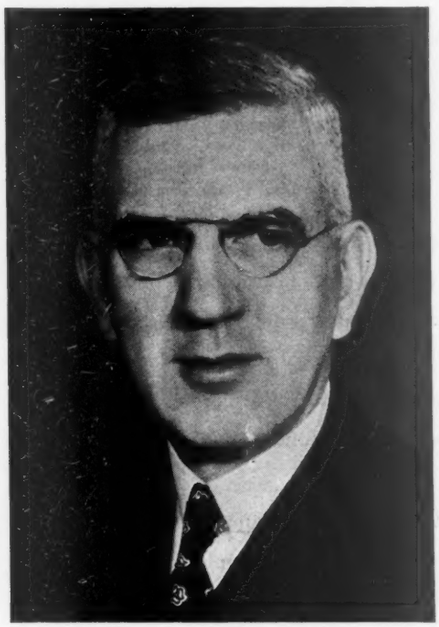
Assurance of a petroleum supply for the navy in the future, as in the past, lies in encouragement of private operators who have always proved able to supply the navy with sufficient fuel when and where it was wanted and at a price substantially lower than any other country could command.

The "sea of oil" that won the war has increased 400 per cent, with a reserve large enough to meet any wartime situation, all accomplished by private initiative.

Proclaiming an area a petroleum reserve does not guarantee any oil, and certainly can be no insurance against a national emergency which can be supplied promptly only from actual production.

G. F. Smith and J. G. Dyer Made Vice Presidents of Continental

Continental Oil Co. has two new vice presidents following a New York meeting of directors at which George F. Smith was elected vice president and treasurer, and J. G. Dyer was elected vice president in charge of production and drilling east of the Rocky Mountains.



G. F. SMITH

J. G. DYER

Walsh-Healey Bill Amendments Tied With Labor Relations Act

A bill tightening the provisions of the Walsh-Healey public contracts act and tying it up with the national labor relations act has just been reported by the senate committee on labor. The existing Walsh-Healey act provides that in all contracts for supplies for the federal government over $10,000 the contractor must agree to work his employes no more than 8 hours in one day nor 40 hours in one week, to abide by minimum wages when fixed for any industry by the secretary of labor, to refrain from using child labor, and to maintain certain sanitary and safety standards.

The bill just reported makes the act applicable to contracts of $2,000 or over and in addition applies to all subcontractors and suppliers with contracts of more than $500, and makes the main contractor responsible for seeing that all subcontractors comply with the provisions of the law. These provisions are designed to prevent the splitting of bids by government purchasing agents to evade the law and to prevent suppliers from evading it by turning over their contracts to subcontractors.

The most important provision requires the procurement division of the treasury department to maintain a blacklist of firms which are not complying with the Walsh-Healey act and which therefore will be ineligible for government contracts of any sort for three years, and requires that this blacklist also include the names of all firms against which the National Labor Relations Board has issued any order. Since the N.L.R.B. has outstanding a large number of orders requiring employers to reinstate certain employes, to disband company unions, and to bargain with certain other unions, passage of this bill, it has been estimated, would immediately add from 300 to 800 firms to the list of those which could not obtain government contracts of any sort for the next three years. The bill also tightens the Walsh-Healey act in a number of other respects and it is strongly supported by the secretary of labor, the National Labor Relations Board, and by labor organizations.

Obituaries

JAMES H. LOCKHART, 75, son of Charles Lockhart, one of Pennsylvania's pioneer oil men, died in Pittsburgh May 16.

NORMAN XAVIER, 54, assistant general manager, Texas Co. in Shanghai, China, died May 19 of a heart attack. He had been employed by the company for 20 years, serving in China for the past 14 years.

HENRY FISHER, 79, former director of Standard Oil Co. of New York and executive of Socony-Vacuum Oil Co., Inc., died May 17. Upon his retirement January 1, 1936, he was the oldest executive in point of service with Socony-Vacuum.

CHARLES McNAIR, 56, Toronto, Ontario, manager of the railway sales department of Imperial Oil, Ltd., died at Kingston, Jamaica, recently. Entering the oil business with the Galena-Signal Oil Co. in 1913, he became vice president, the company being later acquired by Imperial Oil, Ltd.

J. H. JENKINS, vice president of Tide Water Associated Oil Co., died last week in San Francisco. He was at one time in charge of all Tide Water operations in Texas. He was one of the first petroleum geologists in the Mid-Continent. At various times he went to South America and other countries to survey oil prospects for Tide Water.

Indiana Gas Association Holds Its Annual Meeting

GARY, Ind.—With 450 representatives of Hoosier gas companies in attendance at the twenty-eighth annual convention of the Indiana Gas Association at Gary, May 16 and 17, the association held its most successful assembly.

Dean H. Mitchell, Hammond, vice president and general manager, Northern Indiana Public Service Co., was elected president, succeeding H. Carl Wolf, Muncie, president, Central Indiana Gas Co. Paul A. McLeod, New Castle, Public Service Co. of Indiana, was named vice president. The new secretary-treasurer is H. Wayne Thornburg, Anderson, Central Indiana Gas Co. Directors for 1938-39 are Louis B. Schiesz, Indianapolis, vice president and general manager, Northern Indiana Power Co.; H. G. Armstrong, Terre Haute, Indiana Gas Utilities, and A. V. Grief, vice president and general manager, Gary Heat, Light & Water Co.

Bill Aimed Against "Hot" Oil Offered in Louisiana Senate

BATON ROUGE, La.—A bill aimed at transporting of "hot" oil was introduced in the state senate by Senator Sidney W. Sweeney, of Lake Charles. It would "protect, safeguard and guarantee to the state full and correct payment of taxes and licenses with reference to oil, oil leases or oil rights."

Senator Sweeney said the proposal "strikes at the heart of transporting and handling of illegally produced oil" by providing "strict and reliable" methods ror checking and measuring all oil produced in Louisiana before it is allowed to enter the channels of commerce.

Texas Mid-Continent Meeting At San Antonio in October

George C. Gibbons, executive vice president, announces that the annual meeting of the Texas Mid-Continent Oil and Gas Association will be held at San Antonio, Tex., on October 27, 28, and 29. The San Antonio wildcat committee will meet soon to organize and arrange for headquarters and other preliminary details of this annual Texas oil men's reunion.

THE MARKETS*

CRUDE OIL: *Sharpest drop in daily production recorded in five years is cheering development of week, with East Texas showing biggest decline. Continuation throughout June of two-day-a-week shutdown in Texas is ordered. Recent 25-cent cut in crude prices by Kanotex Refining Co. causing more producers to shut in their wells rather than sell at the reduced price. Further price cuts now believed unlikely.*

REFINERY: *Firmer gasoline market in most areas. Stocks moving into better position and tankcar prices stiffening. In Mid-Continent territory distress inventories cleared up, and many refiners behind on shipments. Inquiries for fall heating oils are appearing.*

TANK-WAGON AND POSTED DEALER: *Although road conditions have impaired retail gasoline business in some regions, dealer buying has not been disturbed seriously. Continental Oil Co. adjusted third-grade prices at a few points and Standard of Kentucky lowered its prices in some areas.*

FINANCIAL: *Oil shares recorded further losses, suffering with the rest of the market and closing near their lows. Average of 30 representative stocks week ending May 21: High, 26.55; low, 25.25; close, 25.32. Week ending May 14: High, 27.89; low, 26.23; close, 26.55.*

**Additional information in market section.*

Producers and Buyers Respond Quickly to An Emergency

By JAMES McINTYRE

With a decrease of 176,728 bbls. a day in crude oil production in the United States and decreased allowables in the large producing states east of California, the general oil situation is much improved. The deep cut in production is expected to be made even deeper during the remainder of May and to continue so throughout June if necessary.

Renewed opposition to government control, or regulation, of the oil business, and complete confidence in the Texas Railroad Commission were voiced at last week's meeting of the commission in Austin. There was no uncertainty as to the attitude of the great mass of producers who attended the meeting, and this included East Texas operators.

John Schroeder, of Longview, representing the East Texas Independent Petroleum Association, made a demand for federal control of the oil industry, alleging the Interstate Oil Compact Committee was unable to handle the situation. Mr. Schroeder is an employe of Danciger Oil & Refining Co. He was confronted by a storm of opposition, and Col. E. O. Thompson, chairman of the compact committee and a member of the Railroad Commission of Texas, said, "I will fight to the death any effort for federal control, as long as I am a member of this commission."

F. W. Fischer, of Tyler, said producers in East Texas are behind the commission 100 per cent for curtailment of production, and cited a recent meeting of producers in Tyler at which they voiced their accord with the commission's action.

Federal control was opposed by Marion Church of Dallas, speaking for the Independent Petroleum Association of Texas, and by M. T. Flannigan, an East Texas operator, who said the federal government had never made a success of any business it had tried to run. H. J. Bryant of the Tyler Chamber of Commerce endorsed the commission's two-day shutdown order and promised that East Texas would take its share of any cut to meet market demand but only after being equalized with other fields.

Producers Present Program

P. F. Gwynn, of Wichita Falls, president of the North Texas Oil and Gas Association, but on this occasion also representing the Independent Petroleum Association of Texas, Panhandle Producers and Royalty Owners Association, and the West Texas Oil and Gas Association, presented a program adopted by the several association named in which the following suggestions were made:

That the commission call to attention of other oil-producing states the need for cooperation in a sound program of curtailment, and seek action.

That the commission "continue as a necessary expedient in meeting the emergency the Sunday shutdown order, but that the Saturday shutdown order if necessary be continued only as an immediate temporary measure until such time as sufficient cooperative curtailment can be effected to meet the situation through the application of other means of curtailment."

That the grant of special concessions, permits and allowables be discontinued and that an immediate readjustment be made on an equitable and proportionate basis.

That the burden of curtailment be put on flush fields to discourage unnecessary drilling.

That the commission discontinue granting of special allowables to any fields to meet export demand and to allocate such demand among all fields.

The group contended it was unfair for Texas, Kansas, New Mexico, and Oklahoma to bear the brunt of the effort to reduce the national outlet "and have other states ignore the emergency and produce without restriction."

Ray Johnson, of the Panhandle Producers and Royalty Owners Association, pleaded for a bigger allowable for Panhandle fields. He said because of the low allowable in that area 8,000 bbls. of crude oil per day had been taken out of storage in the past 30 days.

Continued Through June

The Railroad Commission of Texas met again on Monday, May 23, and voted to continue the Sunday and Saturday shutdowns throughout June.

The allowable production for June 1, start of the new monthly proration period, was set at 1,578,726 bbls., which compared with 1,543,268 bbls. on May 1, but it was estimated that due to the shutdowns production in June would approximate 1,159,713 bbls. daily.

Commission officials said production would not increase during the month as formerly because top allowables were set for the various fields. With completion of each new well, output of the old wells will be reduced to give that well a share of the field's output. In the past, new wells have been given the same output as the old ones and the latter have not been cut until issuance of a new proration order.

The federal Bureau of Mines, which estimates the national market demand, had reported 1,329,300 bbls. would be needed daily from Texas in June.

As in the past, the Rodessa field, because of its tristate character, was exempted from the two-day closing, but it received a 10,177-bbl. cut in its daily production schedule. This, the commission explained, was due to the fact pipe lines could take no more. The Rodessa allowable for June was fixed at 30,531 bbls.

There are from 80 to 90 wells in the K.M.A. field in Wichita and Archer counties without a pipe line connection. The Texas Pipe Line Co., the largest shipper of oil out of that field, recently announced that it would not take on any new connections, but later amended this with the announcement that the company would take on new connections where the producers provided the pipe lines from the leases to the company's lines.

The result of the two-day-a-week shutdowns was plainly shown in the production report for the state for the week ending May 21. Texas during that week produced an estimated total of 8,355,445 bbls. as against 9,237,053 bbls. during the week ending May 14, and 9,482,249 bbls. during the week ending May 7. In two weeks' time it had taken 1,126,804 bbls. off the market and kept the oil in the ground. If the commission can keep 5,000,000 bbls. of Texas oil off the market between May 21 and June 30 it can, with the assistance of the Kansas and Oklahoma Corporation Commissions get the oil business over a dangerous "bad place in the road."

Oklahoma had not done much up to the close of the production week to assist in the situation. With an allowable of 405,000 bbls. per day for the remainder of the month it produced an estimated 471,325 bbls. per day. Kansas with a decrease of 19,000 bbls. per day made a much more impressive showing in the right direction.

W. J. Armstrong, state conservation officer in Oklahoma is puzzled and worried over the delay on the part of pipe lines and producers in getting production down to the allowable for the last half of the month, and is endeavoring to find where the corporation commission's proration orders are being disobeyed. The current week's production may show a greater decline as a result of his efforts.

New Mexico conservation authorities made a more than 12 per cent cut in the allowable production of oil in that state in the second half of May, shaving it down from 103,900 bbls. a day to 91,000 bbls. a day, and the average production of the state during the week closing May 21 dropped to 93,560 bbls., a decline of 7,820 bbls. per day from the record of the previous week.

Kansas Situation

With Kansas allowable down to 160,000 bbls. per day, Stanolind Pipe Line Co. began taking 90 per cent of the production from its connections as against 75 per cent previous to the cut in the allowable, but is said to be taking no more crude than before. This is explained by the fact that while the former allowable was 173,000 bbls. per day the Kansas Corporation Commission permitted the running of underage oil, which brought the quantity of oil allowed to be moved from leases to about 187,000 bbls. a day. The Texas Co. and the Kanotex Refining Co. which have been practicing proration by pipe line agreed to take 100 per cent runs during the remainder of May. The Texas Co. took only 90 per cent of its net allowable runs in April and Kanotex 75 per cent. Phillips Petroleum Co. was taking 70 per cent of the May net allowable as against 75 per cent of the April allowable, and Sinclair Prairie 85 per cent of the May current allowable.

The situation in Illinois is anything but satisfactory. There is no regulating body in that state and while pools in the McClosky sand are under no restrictions, the Centralia pool in Marion and Clinton counties, and the Dix pool in Jefferson and Beecher City pool in Fayette County, all Benoist sand pools, are restricted to no more than 26 bbls. per well per day.

ENGINEERING STUDENTS *from universities throughout the country were especially interested in the exhibits. One group from the University of Minnesota headed by Walter H. Parker, E. M. professor of mining, consisted of: Ray Dervey, Donald Johnson, George Nelson, Theodore Nylund, Donald Prescott, Clifford Ryan, Benjamin Alvarado and Orville Lundstrom*

EXPOSITION RECORD GIVES ASSURANCE OF GREATER 1940 SHOW

By Dal Dalrymple

If history repeats, the eleventh International Petroleum Exposition to be held in Tulsa in 1940 will be larger than the tenth oil show which closed last Saturday night, after eight successful days that saw records of all previous expositions surpassed. Plans designed to enlarge and improve the show two years hence were being considered even before this year's exposition had ended.

Many of the 1938 exhibitors, meeting with exposition officials and directors at breakfast Saturday morning, promised their support and that of others for the next show. Some of the exhibitors already had been to exposition headquarters to make reservations for 1940, with a majority wanting larger spaces than they had this year. In response to requests of officials, they made the following suggestions for the next show:

That exposition officials conduct registration of visitors, with all persons attending the show being requested to register and wear badges giving their names and business connections.

That the housing program for out-of-town visitors to the show be improved, with exorbitant rentals eliminated.

That exhibitors bar outside entertainment features from their booths, thus avoiding confusion.

That more exhibit space be provided.

That exhibits be arranged according to various classifications in the industry.

In response to these suggestions, W. G. Skelly, president of the exposition, said: "The exhibitors pay the bill and cannot afford to exhibit unless they get value received. It will be our endeavor to please the exhibitors, the oil companies and the public, and we unhesitatingly promise them a greater and better exposition in 1940."

The tentative plans for 1940 include enlargement of the present 20-acre site, the addition of several more permanent buildings and the probable award of a medal and a large monetary prize to the individual making the greatest contribution to the industry every two years.

Attendance Soars

When the 1938 oil show was concluded with the closing of the gates at 11 p.m. Saturday, a new attendance record had been set, with 226,427 persons having passed through the turnstiles in the eight days of the exposition. The 200,000 mark was passed the last day of the show, when 27,603 persons visited the grounds.

Sales records also are believed to have been established at the 1938 show, although exact figures were not available. Sales amounting to between $4,000,000 and $5,000,000 were reported in about 100 answers to questionnaires given the 576 exhibitors. Sales made by exhibitors not reporting undoubtedly would increase the total considerably. Additional sales totaling several million dollars were anticipated during the next few months, growing out of contacts made and negotiations started during the oil show. Exhibitors generally expressed themselves as highly pleased with results.

Science Hall Popular

The Hall of Science proved to be the most popular building on the grounds, the $350,000 technical and scientific exhibit being a strong drawing card for the lay public as well as oil and equipment men. Because of public demand, the science building was open Sunday following close of the exposition for benefit of those who desired to see it again or had not previously seen it. Preliminary plans for the next exposition include an even larger and more comprehensive scientific display.

Highlights of the final days of the exposition included the first aid contest and safety meeting, and several events honoring the oldtimers and pioneers of the petroleum industry.

Seventeen teams participated in the safety contests held on the exposition grounds Friday, first place being won by the Texas Pipe Line Co. team of Okmulgee, Okla. Members of the winning team included S. R. Morton, team captain, C. L. Casey, Noel Evans, Al Adams, C. L. Van Zant, A. E. Ford, K. H. Woodward and O. N. Wells.

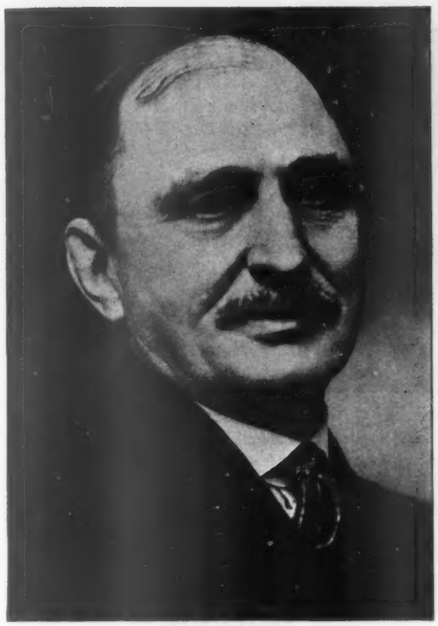
Second and third places were won by teams A and B, from the West Tulsa refinery of the Texas Co.

Other teams in the contest were entered by Tide Water Associated Oil Co., Drumright, Okla.; Magnolia Petroleum Corp., Stonewall, Okla.; Cities Service Oil Co., Ponca City, Okla.; E. H. Moore, Inc., Ada, Okla.; Phillips Petroleum Co., Bartlesville, Okla.; Ohio Oil Co., Shreveport, La.; Ohio Oil Co., Edmond, Okla.; Kendall Refining Co., Bradford, Pa., and Ohio Oil Co., Bridgeport, Ill. An exhibition not included in the contest was given by a safety team from Oklahoma A. & M. College.

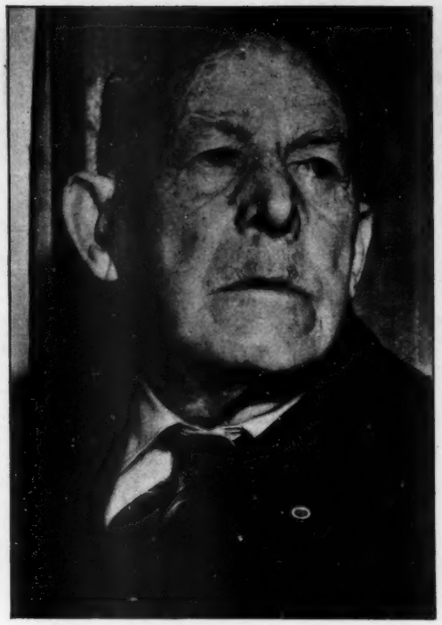
Awards to the prize winners were presented

C. H. Jones, Odessa, Tex., Devonian Oil Co.; J. N. Lewis, Odessa, Tex., and O. W. Lynch, Hobbs, N. Mex., Gulf Oil Corp.

E. C. Jenkins, Skelly Oil Co., Tulsa; E. S. Templar, Skelly Oil Co., Russell, Kans., and W. R. Shrier, Skelly Oil Co., Monahan, Tex.



JOHN W. VAN TINE
Grand Old Man of the Petroleum Industry



M. P. HANLEN
The Pioneer of Pioneers

JOHN EDGERTON CROSBIE
Grand Old Man of Tulsa

by Mr. Skelly at a safety dinner and meeting in the Tulsa Chamber of Commerce dining room Friday night.

Safety Engineers

Correlating its program with that of the International Petroleum Exposition, the Mid-Continent Petroleum Safety Council held a series of meetings Thursday and Friday at the Hotel Tulsa which attracted more than 100 safety engineers.

D. D. Fennell, president of the National Safety Council, delivered one of the principal addresses and in it he pointed out the savings in life and property that have been affected by its 4,500 members since the council has become organized. These savings, as applied to the oil industry, were outlined in greater detail by H. W. Boggess, in charge of safety work for the Sinclair Prairie Oil Co.

Several hundred oldtimers, men who pioneered in the petroleum industry, were entertained by the exposition and individuals during the oil show, the climax coming Friday with the awarding of medals to three of their number who were signally honored.

Oil Veterans Honored

John W. Van Tine of Bradford, Pa., was awarded the title of "Grand Old Man of the Oil Industry." He was born in Garver's Ferry, Pa., in 1857, and has been active in the oil industry since 1869, when he went to work at Venango, now South Oil City, Pa. He became familiar with the operation of oil wells while assisting his father, Charles W. Van Tine, who operated a ferry on the Allegheny River at Oil City. One day a pumper in the employ of Phillips & Van Arsdall failed to report for work. Young Van Tine—he was 12 years old—offered his services, telling Mr. Phillips he was familiar with pumps and pumping. He got the job. Since then he has been in the business continuously in the Pennsylvania fields, and today is still active in the management of his properties at Dallas City, Pa. He did not attend the exposition. His award was accepted by W. L. Connelly, chairman of the board of Sinclair Prairie Oil Co., and was to be forwarded to him.

John E. Crosbie of Tulsa was named the "Grand Old Man of Tulsa," but he, too, was unable to be present to receive the award, because of illness. The medal was accepted for him by his son-in-law, Cyrus Sweet, Tulsa banker. Mr. Crosbie was born in Petrolia, Ontario, in 1862, and began working in the Petrolia oil fields as a tool dresser when 16 years old. He studied the business and soon obtained responsible positions. At one time he was in charge of operations for a large company in Sumatra, Dutch East Indies. He later was active in several Texas and Oklahoma fields, and in 1906 came to Tulsa and became a prominent operator in the Glenn pool. Since then he has been active in Tulsa oil, banking and civic affairs. His firm, J. E. Crosbie, Inc., is one of the widely known independent operating companies in Oklahoma, with production in Oklahoma, Texas and Arkansas fields.

Pioneer of Pioneers

To M. P. Hanlen of Tulsa went the honor of being acclaimed the "Pioneer of Pioneers" at the exposition, the designation given the oldest oil man to register. He was born in Butler County, Pa., March 29, 1850, and began helping his father, Joseph Hanlen, one of the first drilling contractors in the Oil Creek area, when 10 years old. Afterward, he worked in the oil fields of Pennsylvania, West Virginia, Ohio, Kansas and Oklahoma, but retired in 1930 when his sight began to dim. At one time he was associated with Mr. Crosbie in the Kiefer, Okla., field. Earlier Friday, Mr. Hanlen attended the oldtimers' picnic and, deciding that was enough festivity for one day, was not present when medals were awarded later at the exposition grounds. So his award was accepted for him by Hal Gruber, general chairman of the Oldtimers' committee.

A former "Pioneer of Pioneers," A. W. Gordon of Tulsa, was present and participated in the pres-

STELLAR ATTRACTION—*As high as 4,000 visitors an hour passed through Hall of Science*

entation ceremony. He is 96 years old and actually was the oldest man to register, but once having been selected for the honor was ineligible for a second award. Presentation of the medals was made by J. P. Flanagan, member of the committee that selected the grand old men.

Several special entertainment features were given in honor of the pioneers. These included a picnic at the Frank Wolfe farm south of Tulsa, a barbecue at M. J. Flanagan's country place northeast of Tulsa and a luncheon in the Cafe de Petrol on the exposition grounds, with Mr. Skelly as host. Early in the week a memorial program was held on the exposition grounds, near the replica of the Drake well, where a monument to the Oldtimers is to be placed. A model of the monument, to occupy the site until the permanent structure is erected, was unveiled.

They Inspire Poetry

The following poem, "The Old Belt House," composed by A. P. Hall of Tulsa, was dedicated to the oldtimers:

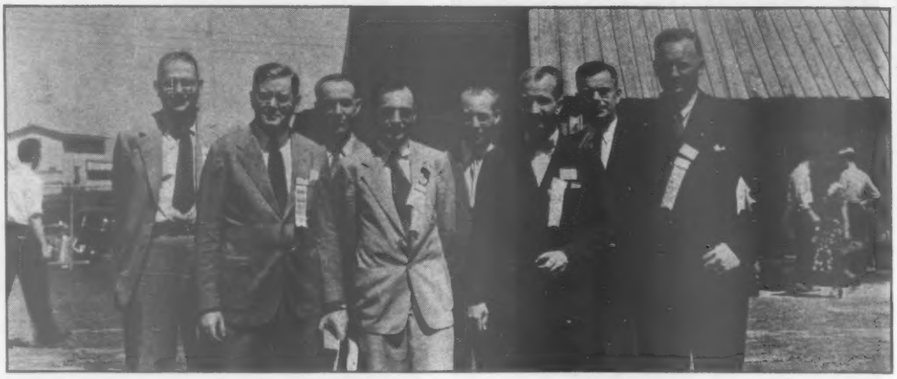
In the memory of the oil men
There's a place that's held most dear,
Where the oil boys used to gather
With their friends of yesteryear.
It was known as the "Old Belt House"
And the boys would gather there
To meet their friends and comrades
Who came in from everywhere.

There you'd find the Superintendent
And the men who owned the wells,
Rig builders, Roustabout, and Driller,
With some fairy tales to tell;
Of the hole that they made on Bird Creek
And the Tucker sand they'd found,
And then the boys from Glen Pool
Would put the string around.

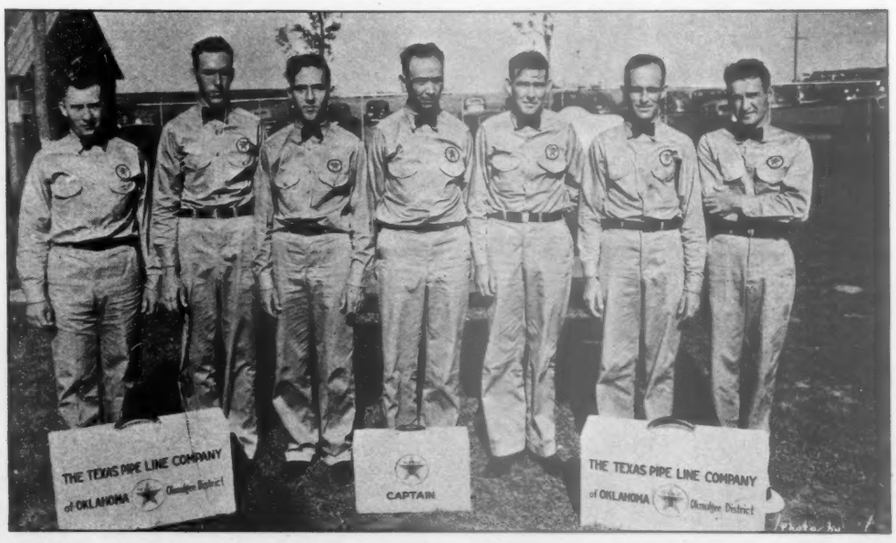
Then the height of their ambition
Was to work and strive to win,
And just beat the other fellows,
When it came to drilling-in.
There they met with their employer,
And all seemed to understand,
That there was no other union
But the Brotherhood of Man.

Although the exposition primarily is an industrial show, entertainment features were not entirely neglected. In addition to the parties given for the pioneers, there were numerous dinners, banquets and private entertainments for visiting oil men at Cafe de Petrol and in downtown dining rooms and private residences. Outstanding among these was the special program at the Chamber of Commerce Friday in honor of the 43 foreign delegates who attended the exposition. Special programs were staged by the Purchasing Agents Association, the Petroleum Motor Transport Association, drilling contractors, oil scouts and various engineering and geological organizations. The several Tulsa luncheon clubs were hosts to visiting oil men at their meetings, and several individual Tulsa oil men entertained at their homes. Visiting oil writers were guests at luncheon and golf at Southern Hills Country Club, and an oil golf tournament was held at Tulsa Country Club. The Exposition Rodeo, held in Fair Pavilion adjacent to the oil show grounds, provided entertainment for large crowds nightly.

One of the big thrills of the exposition wasn't on the program—the finding of oil in a well drilled on the exposition grounds by one of the exhibitors. The Franks Manufacturing Co. of Tulsa, exhibiting a portable rotary drilling outfit, began actual drilling when the oil show opened. The drill went through a coal vein at 80 feet, had a showing of gas at 481 feet, and found oil in Oswego lime at 501 feet. No test of the oil showing was made, but observers estimated it would be good for 15 bbls. a day after a shot—sufficient to justify the statement that the International Petroleum Exposition sits above a pool of oil.



ENGINEERS HAVE THEIR DAY—John Evans (at left) representing George S. Bays as host of day. Assistant hosts and the society represented: Glenver McConnell, Oklahoma Society of Professional Engineers; J. P. D. Hull, American Association of Petroleum Geologists; W. T. Born, Society of Exploration Geophysicists; Dan Hamilton, Society of Automotive Engineers; A. J. Kerr, Engineers Club of Tulsa; J. H. Engelbrecht, secretary of the Engineers and Scientific Societies Committee; Rich Thompson, American Welding Society.



The Texas Pipe Line Co. safety team of Okmulgee, Okla., won first place in the first-aid contest at the International Petroleum Exposition. Members of the team, left to right, are: Noel Evans, C. L. Casey, A. E. Ford, Team Captain S. R. Morton, O. N. Wells, A. S. Adams and C. L. VanZant

TIDELANDS

(Continued from Page 21)

the state. The state receives approximately 37½ per cent of all oil and gas produced on tideland property under the state oil land leasing act and allocates 52½ per cent of receipts for reclamation work. On one property leased by the city of Long Beach the municipality received a substantial cash bonus and a royalty of 50 per cent of all oil and gas. If the courts sustain the federal government's contention operators ask will they lose their equities resulting from right of discovery and subsequent development? What of the cash royalties already paid to the state?

The allegation that California discoveries are becoming so infrequent it is necessary to establish additional naval reserves is absolutely false because California operators have discovered so many new fields during the past few years that the production situation has been seriously jeopardized. Furthermore the tidelands the bill proposes to place in the naval reserve cannot be shut in as operators are producing wells on littoral lands and will ultimately drain the total reservoir unless offset wells are kept in operation.

California's attorney general, U. S. Webb, said:

"California's tideland and submerged land came into the jurisdiction of the United States through the cession of the treaty of Guadalupe Hidalgo and during the interim prior to the admission of California into the union the United States held such lands in trust for the future state, and the federal trust ceased upon the admission of the state. Since its admission, California has continued to administer such trust for the beneficiaries thereunder."

California interests are mapping a strong fight against the resolution and are taking steps to prevent it being called up on the floor of the house. Governor Merriam wired the judiciary committee which reported the resolution that the people of California are thoroughly aroused at this threatened invasion of their sovereignty and will use all legal weapons to resist it.

Rush Blodgett, executive vice president of the California Oil Producers Association and several state officials are now in Washington recruiting congressional opposition and California members having asked for a chance to express their opposition, the committee has ordered a further hearing. They are encouraged by a report that Attorney General Cummings does not favor the legislation and feels the federal government has little chance of establishing title to coastal oil lands heretofore administered by California.

Output From New Illinois Fields and Probable Trend

By ALFRED H. BELL*

Digging slushpits north of Noble, Illinois

It is now almost a year since the first big Illinois Basin well came in. This was Pure Oil Co. No. 1 B. Travis, the discovery well of the McClosky sand production in the Clay City field. It had an initial daily production of 2,642 bbls. flowing. With the background of a year's development it is now possible to appraise the significance of the new discoveries in the area with more accuracy than has been possible previously.

Since January 1, 1937, 12 new oil pools have been discovered in Illinois in which 428 wells were producing on April 28, 1938, a total of approximately 30,700 bbls. of oil per day (72 bbls. per well per day). Of the 428 wells in the new fields 25 were flowing on April 28, 1938, all in the Noble field, Clay County, and the remaining 403 were being pumped. Reservoir pressures are low, the amount of gas produced per barrel of oil recovered is relatively small, and the flowing life of the wells is short. The daily rate of production for a single well declines rapidly at first, especially in the fields producing from the McClosky oolitic limestone.

Up to May 1, 1938, the new fields of Illinois have yielded approximately 6,300,000 bbls. of oil in 11 months.

The old fields of the state continue to produce at about the same rate as during the past few years, an average of about 384,000 bbls. per month or 4,225,000 bbls. during the same 11-month period.

In view of the opening of new fields in Illinois and a substantial increase in output of oil above the level of production from the old fields, it may be interesting to consider whether the production of the new fields has had an appreciable effect upon the current market conditions in the oil industry. There is a tendency to regard the situation in Illinois as a substantial factor in contributing to the unusually large supply of petroleum stocks aboveground. This assumption appears to be unwarranted if increased output is calculated on a basis of days' supply for the United States added by the state in 1937 over 1936 which is nine-tenths of a day.

A more accurate perspective of the situation can be obtained by comparing the increase in 1937 in Illinois with those of other states. On a basis of an average daily demand of 3,200,000 bbls. of crude oil, the contribution of important producing states is as follows:

TABLE 1—CRUDE OIL PRODUCTION*
(Thousands of barrels)

State—	Increase 1937 over 1936	Added days' supply for United States
Texas	83,321	26.0
California	23,748	7.0
Oklahoma	22,369	7.0
Kansas	12,344	3.9
New Mexico	11,574	3.6
Louisiana	10,019	3.1
Wyoming	4,121	1.3
Michigan	4,000	1.3
Illinois	2,951	0.9
Pennsylvania	2,085	0.6

*Prepared by Dr. W. H. Voskuil, mineral economist, Illinois State Geological Survey.

Increases in Arkansas and Indiana are negligible and losses were recorded for Colorado, Kentucky, Montana and New York.

Monthly production of crude oil in Illinois, with an approximate division into old and new fields is shown graphically in Figure 1. The very steep upward trend during the period, July to September, 1937, was caused principally by the new flush production in the Clay City and Noble fields. This is in contrast to a more gentle upward trend which has continued, with some fluctuations, up to the present.

In this connection it is of interest to compare the monthly increases in production for the state with the number of new oil wells completed each month. This is done in the following table:

TABLE 2—MONTHLY CRUDE OIL PRODUCTION AND WELL COMPLETIONS IN ILLINOIS*

	Crude oil production in Illinois (bbls.)	Increase over previous month (bbls.)	No. of new oil wells comp.	Increase per new oil well (bbls.)
1937—				
June	463,000	53,000	16	3,300
July	530,000	67,000	18	3,700
August	674,000	144,000	31	4,650
September	849,000	175,000	63	2,800
October	912,000	163,000	56	2,900
November	990,000	78,000	41	1,900
December	1,085,000	95,000	37	2,560
1938—				
January	1,128,000	43,000	40	1,070
February	1,108,000	—20,000	35	—570
March	1,330,000	222,000	82	2,700
April	1,420,000	90,000	71	1,260

*Statistics from U. S. Bureau of Mines except for April, 1938, which is estimated.

The rather steady downward trend in added production per new well completed is illustrated

Diesel engines driving mud pumps in Centralia area, Illinois

*Geologist and head, oil and gas division, Illinois State Geological Survey, Urbana; published with the permission of the Chief.

in the last column of this table. The actual amount of production added by the new wells each month is greater than that shown in the table, because production from the wells completed in previous months is declining. During the next few months as drilling development continues in the new fields

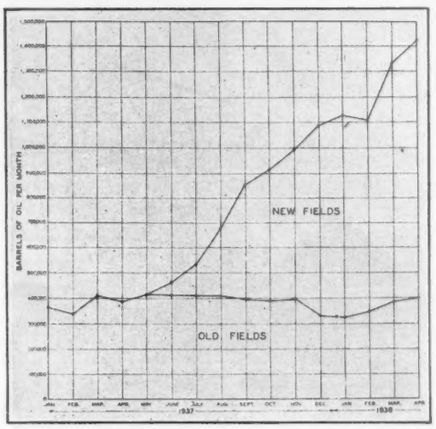


Fig. 1—Monthly production of crude oil in Illinois from January, 1937, to April, 1938. Total figures for the state are from the U. S. Bureau of Mines monthly reports, except for April, 1938, which is estimated. The division into old and new fields is approximate

of Illinois it is likely the decline of the producing wells will continue in an increasing quantity in relation to the added production from the new wells. If so, the production curve will continue to rise during the next few months but at a declining rate. In other words, a balance appears likely between new production and the decline of production from previous wells, which would result in

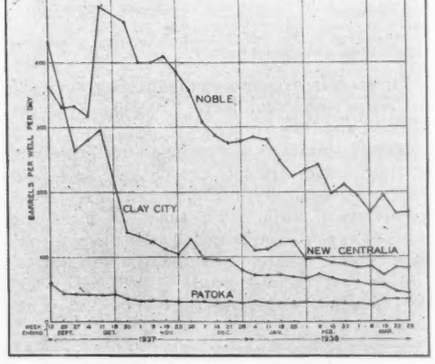


Fig. 2—Decline curves for four new Illinois fields, based on average production per well per day by weeks from September 6, 1937, to March 29, 1938. (Production in the Patoka field began in February, 1937. McClosky production began in the Clay City field late in May, 1937, and in the Noble field in August, 1937)

relatively steady rate of production for the state. This balance may, of course, be disturbed by the discovery of important new fields or by economic factors such as price changes or proration.

The average rate of production decline per well in the four new fields of Illinois which have yielded the largest production to date are illustrated graphically in Figure 2. It will be noted that the early declines are much more rapid in the fields producing from the McClosky (Ste. Genevieve oolitic limestone)—the Clay City and Noble fields—than they are in the fields producing from the Bethel sandstone (Benoist sand) of the Chester series—Patoka and New Centralia fields. Thus, the spectacular initial productions obtained in some of the McClosky wells are not a true indication of the long-time trend of oil production in this region.

INSTITUTE

(Continued from Page 27

available. They recommended the petroleum industry give further study to the possibility of developing fuels with better antiknock characteristics at part-throttle opening. They indicated the current problem is not pressing because of "the flexibility of the spark-advance mechanisms and the setting of these devices built into the car by the manufacturer in order that his product may digest the product of various oil refiners."

Measurement of bottom-hole pressures was recommended to the Division of Production by C. V. Millikan, Amerada Petroleum Corp., Tulsa, as a means of determining reservoir condition and the ability of an oil well to produce. (Page 44, this issue.)

The Division of Production received from B. H. Sage, B. L. Hicks, and W. N. Lacey, of California Institute of Technology, a report on the Institute's Research Project No. 37, "Tentative Equilibrium Constants for Light Hydrocarbons." A paper on "Practical Dynamometer Tests," was presented by H. N. Marsh and E. V. Watts, General Petroleum Corp.

Practical methods for laboratory control of the corrosion of distillation equipment and of desalting processes were discussed before the Division of Refining by L. L. Davis and C. A. Neilson, Continental Oil Co., Ponca City, Okla., in a paper prepared jointly with J. M. Jones, of Continental Oil Co., Baltimore, Md. (Page 52, this issue.) Identification and properties of straightrun and cracked residua were reported on by A. H. Batchelder and H. B. Wellman, of Standard Oil Co. of California.

Laboratory development of two satisfactory continuous methods for removing the salts from crude oil were announced by Wendell P. Hawthorne and H. L. Bedell, Socony-Vacuum Oil Co., Inc., White Eagle Division, Augusta, Kans. They described a process utilizing sodium carbonate solutions which, they said, accomplishes the removal of 80 per cent of the inorganic salts and can be duplicated on a commercial scale.

One of the newest problems in accurate measurement confronting the industry has been created by deep drilling. The distance not only taxes the capacity of all available measuring devices, but submits them to stresses and strains which adversely affect their accuracy. A preliminary report was presented Wednesday by C. E. Reistle. Jr., and S. T. Sikes, Jr., Humble Oil & Refining Co., Houston, Tex., who have been working with petroleum engineers to develop some standard method of measuring vertical distances, to correlate the relative accuracy of measuring devices, and to establish some accurate record of tubular goods used in completing wells.

The Division of Production also heard papers on studies of close oil-well spacing in Kansas, presented by E. A. Stephenson, University of Kansas, and on filtration properties in drilling mud, by Milton Williams and G. E. Cannon, of Humble Oil & Refining Co.

The importance of proper storage of crude and products was stressed before the Division of Refining by D. E. Larson, of Chicago Bridge & Iron Co., who said tests have demonstrated that enclosed liquids tend to assume a spheroidal shape, with pressure equalized in all directions, whereas the internal pressure of the gaseous content tends to lift the shape back to the spherical. The resulting compromise, regarded by Mr. Larson as "ideal," is a pudding-shaped tank. Comparative stresses are offset by changing the radii of curvature and by dishing the bottom, while high tensile stresses can be resisted either by increasing the thickness of the welded plates or by installing suitable girders, he said. "During recent years new refining processes and improved blending methods have made it possible to use the more volatile hydrocarbons in the production of superior motor fuels," he explained. "The necessity for preserving these light constituents, which were formerly wasted, has stimulated an extensive search for more efficient methods of storing petroleum products."

The Division of Refining session, devoted to refinery engineering problems, was told by C. O. Rhys, Standard Oil Development Co., Elizabeth, N. J., that the application of the R. W. Bailey theory of creep-stress in tubes and hollow cylinders subjected to heat is enabling the refining branch to utilize with greater safety materials having adequate resistance to extreme temperatures. Mr. Rhys presented formulas and charts for use in practical calculation of needs.

Efforts to develop heating coils and connections adequate to withstand pressures in excess of 5,000 pounds per square inch and temperatures as great as 1,200° F. were outlined by Fred Key and W. H. Clendenin, Key Co., East St. Louis, Ill., who said the factor of safety has been the first thought in construction. Progress made by process engineers has necessitated progress on the part of mechanical engineers, as well as inventions which would not only meet new requirements but provide a higher factor of safety, they said, adding that now it is possible to use tube-connecting devices which at times may leak, but which cannot violently be separated with property damage or loss of life.

B. B. Morton, International Nickel Co., New York, N. Y., reviewed developments in nickel-bearing alloys used in petroleum refining to withstand organic and mineral corrosive agents.

Depths at which oil well casing can be set are not governed solely by the physical properties of steel, the production division was told by W. M. Frame, Spang Chalfant Division, National Supply Co., Ambridge, Pa. Mr. Frame, who presented the second paper prepared since the Institute's committee on the standardization of oil country tubular goods undertook to work with manufacturers and users in the development of casing and tubing having extreme resistance to collapse, declared that 400 tests have demonstrated that residual stresses in pipe structure seriously reduce collapse pressure. The tests, comprising part of the Institute's program to assure the use of casing and tubing which can be set to extreme depths with seasonable safety, revealed also, according to Mr. Frame, that customary methods used in casing manufacture inherently produce high residual stresses of an unfavorable nature in the finished product.

The manufacturer's idea of what he is selling has been harmonized with the oil producer's idea of what he is buying through the transformation of the oil-field equipment salesman into a specialist and consultant, and the efforts of the production engineer to learn design and factory methods, according to H. H. Power, University of Texas. Speaking on "Current Practices in the Selection of Oil-Field Equipment," Mr. Power stressed the progress made both by manufacturers and users of keeping accurate, long-term records of service rendered by equipment.

Methods of preventing accidents and fires were discussed at a group session held by the Institute's Departments of Engineering and of Accident-Prevention in the Lassen Hotel. The speakers were H. E. Dischinger, Shell Petroleum Corp., St. Louis, Mo., and C. L. Swim, Skelly Oil Co., Tulsa.

Department of Justice Outlines Policy on Business

WASHINGTON, D. C., May 23.—Further announcement regarding the government's intentions in prosecuting antitrust cases against the oil industry is expected from the department of justice in the near future, though probably not until Judge Patrick T. Stone at Madison, Wis., rules on pending motions for a new trial of the case concluded there last winter. It is expected Judge Stone will announce his ruling about June 2.

The announcement expected from the department of justice may deal with plans for trial of the second Madison indictment. It may also include a statement of plans for proceeding against oil companies in the eastern section as a result of investigations which have been under way there for many months into charges that major companies have conspired to reduce jobbers' margins and manipulate gasoline prices. Meanwhile, the date for the trial of the case against Ethyl Gasoline Corp. has been set for June 9 in New York City. Investigators are still at work on the west coast but no immediate developments are expected there or in the eastern case.

Statement by Attorney General

Confirming the policy announced recently by Assistant Attorney General Thurman Arnold, Attorney General Cummings last week issued a formal statement of the intentions of the department of justice in reviving its case against automobile finance companies, which was thrown out of court by Federal Judge Geiger in Milwaukee because the department engaged in negotiations for a consent decree while the grand jury was considering an indictment. This statement outlined the policy which the department will follow in this and other antitrust cases with respect to the concurrent use of civil and criminal procedures. This policy was officially stated as follows:

"1. The department will not compromise a criminal case upon an agreement by the defendants to refrain in the future from the violations with which they are charged. We cannot accept the responsibility of condoning violations of the antitrust laws because of a promise to reform.

"2. The commencement of a grand jury proceeding or a criminal prosecution does not do away with the presumption of innocence which surrounds any defendant. It only means that this department is in possession of evidence of violation of law which it deems so compelling that it cannot accept the responsibility of ignoring it and must therefore present it to an impartial judicial tribunal. While the department must exercise a preliminary judgment as to the weight of the evidence, the ultimate responsibility for the weighing of that evidence is necessarily on the grand jury and petit jury and the court.

"3. In using civil and criminal proceedings concurrently (a practice which has been approved by the Supreme Court in the case of Standard Sanitary Manufacturing Co. vs. United States, 226 U. S. 20) it is not the purpose of the department to coerce or compel the prospective defendants to consent to a civil settlement on threat of criminal prosecution. The sole purpose of the criminal proceeding is to present to an impartial tribunal evidence which leads the department to believe that the antitrust laws have been violated. At the same time it has never been the policy of the department to bar its doors at any stage of the proceedings against business men who may desire to propose a practical solution which is of major and immediate benefit to the industry, to competitors and to the public and which goes beyond any results which may be expected in a criminal proceeding.

"Such a solution must be voluntary. While we do not invite the submission of such proposals, it will be our policy in all cases to examine and consider any which may be made.

"They must offer in addition to a prohibition of the violations of the antitrust laws with which the prospective defendants are charged, substantial public benefits connected with the policy of maintaining free competition in an orderly market which could not be obtained by the criminal prosecution.

"If proposals of this character are submitted to the department, it conceives that its duty is to present them to the court before whom the proceeding is pending in order that he may determine whether a *nolle prosse* is justified in the public interest.

"Where the proceeding is still pending before a grand jury which has not yet returned indictments, this method is not strictly a *nolle prosse*. However, the analogy of recommendations for *nolle prosse* will be followed in cases where consent decrees have been submitted to the department before indictment.

"The judge in such cases will be informed of the submission of proposals which the department believes to be in the public interest in order that, if he deems that course desirable, they may be presented to the grand jury for consideration in connection with the evidence."

Price Policies

The price policies of business will continue to be a lively subject for several years regardless of the outcome of the proposed monopoly investigation. Not only through antitrust prosecutions and vigorous enforcement of the Robinson-Patman act, but in every other way possible the New Deal will attempt to use the resources of the federal government to influence prices of industrial commodities.

An example is the current campaign against use of the basing point system of prices, used principally by the steel and cement industries but to a lesser extent in a number of other industries, under which prices are quoted only on a delivered basis, or at a basing point plus freight to destination.

At the same time the treasury department is using its procurement division as a means for attempting to break up what it considers to be collusive bidding and price fixing wherever possible. In a number of recent contracts for government buildings the procurement division has stipulated that the contractor take steps to prevent collusive bidding by subcontractors, and there is evidence this policy will be extended to many other types of government contracts if it proves successful in this field.

The treasury's attempt to break up the basing point system in the cement industry has largely been a failure. Steel is next on the list to be tackled after cement, and if the government has a measure of success there it will extend its experiments to other commodities.

Refinery Expansion

Atlantic Announces Expansion And Development Program

PHILADELPHIA, Pa.—An expansion and development program requiring capital expenditures of $28,000,000, to be undertaken by Atlantic Refining Co. during 1938, is announced by J. W. Van Dyke, chairman of the board. The program will cover acquirement of additional properties in oil producing areas to increase the company's production of crude oil; marketing activities; improvement of operations at the company's large refineries at Philadelphia and Atreco, Tex.; and additions to the tanker fleet.

"Such capital expenditures illustrate the vital part played in the functioning of our economic system by the investment of capital in productive enterprises," says Mr. Van Dyke. "Through these expenditures we expect to reduce costs and bring operations into more complete balance. Only through the improvement and expansion of operations made possible by such capital expenditures is it possible to safeguard and create employment, maintain low costs to the consumer, and provide for a fair return to the individual investor."

New Alberta Refinery Planned By British American Oil Co.

CALGARY, Alberta.—British American Oil Co., which has a large interest in Turner Valley crude production, is considering the erection of a 5,000-bbl. refinery here. No definite decision has been announced but sites close to Calgary, in East Calgary and at High River are being considered. The company is also planning to extend its marketing facilities in Alberta, and recently investigated the possibilities of additional service stations in Edmonton and district.

The British American Oil Co. has a large refinery at Moose Jaw, Saskatchewan, and has advanced approximately $350,000 at various times to assist crude developments in Turner Valley.

Gulf Refining Inaugurates Barge Line on Tennessee

SHREVEPORT, La.—Gulf Refining Co. has inaugurated barge transportation of oil products on the Tennessee River. Three barges loaded with refined products from the company's refinery left Cincinnati, Ohio, with their destination the new Gulf terminal at Guntersville, Ala. The barges will be in regular operation.

Amherst Refinery Converted To Distributing Plant

AMHERSTBURG, Ontario.—The Amherst oil refinery here, inactive for several years and partly dismantled, is being overhauled by Detroit interests which are laying a short pipe line from the plant to the river. The refinery will be converted into a gasoline distributing station.

Hydro-Pete Planning New Refinery in Alberta

CALGARY, Alberta.—Hydro-Pete Oils, Ltd., of Calgary which recently completed a small refinery plant at Red Deer, Alberta, is considering erection of a second Alberta plant at either Vegreville or Camrose. P. L. Hyde is president of the company.

Refinery Expansion Program by United British in Trinidad

United British Oilfields of Trinidad contemplates a refinery expansion and modernization program at Port Fortin which will cost in the neighborhood of $1,750,000. The United British operations in Trinidad are managed by Anglo-Saxon Petroleum Co., Ltd., which has recommended that a portion of the new capital be applied to development of present holdings and to exploration of new properties. The managers feel that if United British is to derive full benefit from its present holdings, Cedros production must be developed to warrant provision of pumping and pipe line facilities to the Point Fortin refinery.

Trinidad Leaseholds has about completed a refinery expansion and modernization program, including cracking and polymerization facilities making its plant in Trinidad one of the most modern outside the United States.

New Montana Refinery Placed in Operation

DENVER, Colo.—The first of Montana's new refineries, built by Yale Oil Corp. at Kalispell, began running crude oil in test runs, during the past week. The plant, of 1,000 bbls. daily capacity, was built at a cost of $250,000, according to Clayton Burke, superintendent, and T. R. Corbett, engineer.

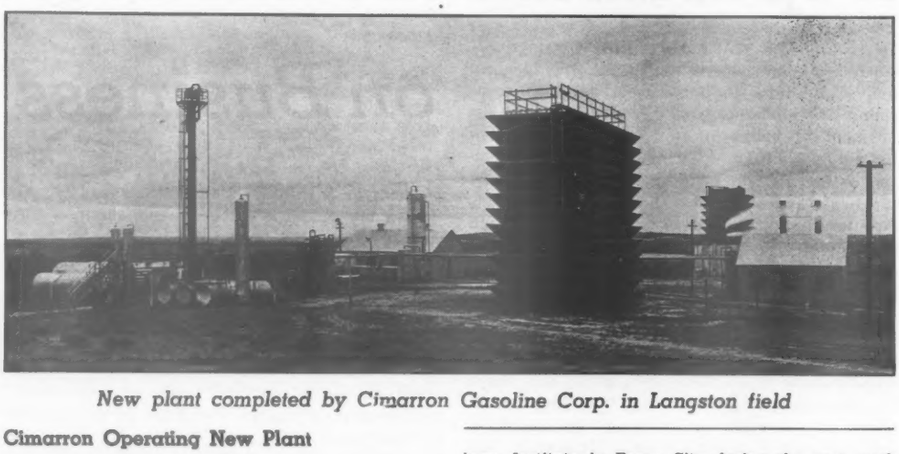
Shawver Shuts in 58 Wells in Protest Against Price Cut

WICHITA, Kans., May 23.—E. B. Shawver announced today that the Stelbar Corp. had shut in all its wells in the Wellington pool, in Sumner County, and the Gueda Springs field in Cowley County, rather than sell the oil to the Kanotex Refining Co. at its 25-cent cut in the posted price. Fifty-eight wells are affected. Mr. Shawver is a copartner in the Stelbar company.

Colombian Well Starts at 160 Bbls. Per Hour at 2,200 Feet

Colombian Petroleum Co. has completed another producer on the Petrolea dome in the southern part of the Barco concession, eastern Colombia. The latest completion is No. 19 La Petrolea which gauged initial of 160 bbls. per hour from the regular pay horizon at about 2,200 feet.

Natural Gasoline



New plant completed by Cimarron Gasoline Corp. in Langston field

Cimarron Operating New Plant In Langston, Okla., Field

The natural gasoline plant completed and put in operation this year by the Cimarron Gasoline Corp. near Coyle, Okla., is the only plant operating in the Langston pool. The company has been organized by W. F. McDonald, president, and O. G. Stokely, secretary-treasurer of McLean, Tex. L. H. Cole is superintendent.

The plant is of the absorption type with a maximum capacity of 4,500 gallons. At present the output is 3,500 gallons; extracted from three to four million feet of gas coming from wells of the Amerada Petroleum Corp., Sinclair Prairie Oil Co., Eason Oil Co., Mid-Continent Petroleum Corp. and the Ohio Oil Co. The plant is operated on field pressure of 30 pounds. Equipment includes a distillation unit, 18-tray absorber, stabilizer, and two 90-hp. boilers operating at 125 pounds pressure. The system holds 6,000 gallons of absorption oil, circulated at the rate of 52 gallons per minute; 8 gallons per minute are circulated over the reabsorber which removes tail vapors off the rich oil vent tank and the stock tanks. Two compressors deliver residue gas with a discharge pressure of 250-300 pounds. Gasoline from the plant is shipped from a loading rack 1½ miles away.

A.P.I. Committees Study Automotive Test Methods

Continental Oil Co. was host to representatives of the Cooperative Fuel Research Committee and the Automotive Survey Committee of the American Petroleum Institute in Ponca City during the past week H. M. Holaday, Socony-Vacuum Oil Co., New York; C. B. Veal, Society of Automotive Engineers, New York; W. F. Lowe, Natural Gasoline Association of America, Tulsa; R. R. Couch and H. M. Trimble, Phillips Petroleum Co., Bartlesville; Dan Barnard, Standard Oil Co. of Indiana, Whiting; Dr. H. W. Best, Yale University.

where these groups have been studying changes in automotive test methods. Walter Miller, vice president, and B. E. Sibley, director of research, of Continental were in direct charge of these operations.

The technicians were studying the octane number and vapor limitations for the average car and revising the methods used in road testing to make these determinations. The principal idea was to create easily reproducible methods and procedure simplifying those which have been used in recent years. A complete report of the four-day series which also included road tests, was presented at the A.P.I. meeting in Wichita.

Present at this Ponca City series were: R. J. Greenshields, Shell Petroleum Corp., St. Louis; Cleveland Walcutt, Ethyl Gasoline Corp., New York; R. W. Goodale, Standard Oil Co. of California, San Francisco; A. L. Clayden and L. W. Hawthorne, Sun Oil Co., Pittsburgh; C. B. Kass, Standard Oil Development Co., New York; Charles W. Butler and J. Edward Taylor, Gulf Research, Pittsburgh; W. Wallace Yeandle, Mid-Continent Petroleum Corp., Tulsa; B. H. Mylius, Cities Service Oil Co., New York; C. L. Fry, Skelly Oil Co., Kansas City; T. H. Risk, Pure Oil Co., Chicago, Ill.; W. G. Ainsley and T. E. Baker, Sinclair Refining Co., New York; Robert Best, B. E. Sibley, Frank A. Suess, and O. D. Horne, Continental Oil Co., Ponca City;

Natural Gas News

Railroad Commission Wins First Round on Sour Gas

The Texas Railroad Commission won the first round of the legal battle to enforce its recent order designed to prorate withdrawals proportionately in the sour gas area of the West Panhandle field.

The United States district court at San Antonio refused last week to grant F. C. and E. P. Henderson an interlocutory injunction, restraining the state from enforcing its new method of proration. As a counter attack, and as a final establishment of the order's validity, the attorney general of Texas has filed suit in the district court for an injunction restraining the company from violating the sour gas order, which was issued May 4. A hearing date has not been set.

The present sour gas proration order allocates daily withdrawals to individual tracts upon the basis of one-third potential, and two-thirds on the product of acreage times rock pressure.

Bill to Regulate Production of Natural Gas in Louisiana

Proposed introduction of a bill in the Louisiana legislature will place before that body consideration of regulating natural gas production in the state. Designed to aid the small gas producer who cannot find an outlet for his wells, the bill would authorize the department of conservation to order minimum and maximum production of gas from any state well.

Texas Puzzled Over Effect of Decision on Rate Cases

AUSTIN, Tex.—Alfred Scott, assistant attorney general, said he would petition the U. S. Supreme Court for a rehearing of the Lone Star Gas Co. gate rate case in which the court reversed a decision of the Austin Court of Civil Appeals that a 20 per cent rate reduction promulgated by the Texas Railroad Commission was valid. It ordered the case sent back to the state appeals court.

Lawyers were uncertain of the effect of the decision. They said there possibly could be a retrial in district court but its effect might be to make final the findings of the district court jury that the reduced rates would be confiscatory and could not be ordered.

The main point of difference between the U. S. Supreme Court and the higher Texas courts was who should determine whether a rate is confiscatory. The federal court indicated, some attorneys said, that it was a function of a district court jury while the state appeals court took the position the railroad commission should make the finding.

The fact that the supreme court reversed the judgment, they said, places in jeopardy other cases involving towns and cities served by the company, one attorney saying: "If the supreme court sustained the jury verdict, we might as well throw up our hands; because there'll be no regulation in Texas."

He pointed out that the Court of Civil Appeals had held there was no jury issue in the case and set aside the jury verdict. If there is a jury issue, he added, there will be a jury issue in every rate case for every one of the 271 cities and towns served by gas utilities in Texas.

Northwestern Utilities, Ltd., Increases Reserve Holdings

EDMONTON, Alberta.—Shareholders of Northwestern Utilities, Ltd., at their annual meeting elected the following officers: President, H. R. Milner; vice president and managing director, E. W. Bowness; general manager, Julian Garrett; secretary-treasurer, J. B. Whelihan; comptroller, F. A. Smith; assistant secretary, A. D. McNab; assistant secretary-treasurer, E. F. McGarvey; directors, F. W. Seymour, E. A. Smith, H. S. Watts, P. D. Mellon, R. Martland, F. H. Russell. Reserve holdings of the company, which supplies natural gas to Edmonton, have been increased by the purchase of between 12,000 and 13,000 acres in the Kinsella field, 95 miles east of Edmonton.

Natural Gas and Petroleum Association Meeting at Windsor, Ontario

WINDSOR, Ontario.—The fifteenth annual convention of the Natural Gas and Petroleum Association of Canada, held here on May 19 and 20, drew a representative attendance of the Canadian industry. Major E. Sweet, president, reported a successful year, with an absence of serious controversial issues.

Papers presented included "Petroleum and the New Nationalism," by Dr. C. S. Evans, geologist, Union Gas Co. of Canada; "Gas Meters and Measurements" by Willis M. Hott, Dominion Natural Gas Co., and "Acid Treatment of Failing Gas Wells," prepared by W. S. Day and read by Charles F. Reed, Dow Chemical Co. One session was featured by a questionnaire conducted by Vice President S. B. Severson with numerous members participating.

The officers were reelected as follows: Honorary president, C. E. Steele, Port Colborne; president, Maj. E. Sweet, Brantford; first vice president, S. B. Severson, Buffalo; second vice president, J. A. Richie, Buffalo; secretary-treasurer, S. A. Morse, Chatham; assistant secretary and treasurer, Joseph McKee, Hamilton; directors, G. D. Wickett, Windsor; J. B. McNary, Hamilton; George H. Smith, Port Colborne; J. A. McNevin, Chatham; C. N. Glenny, Fort Erie. Niagara Falls, Ontario, was selected for the 1939 convention.

United to Build Carbon Black Plant in Kansas

United Production Co. has purchased an 80-acre tract north of Ryus in Grant County, Kansas, on which to build a carbon black plant to utilize the surplus gas produced in the southwest Kansas gas area. Kansas now has only one carbon black plant, which is near Ulysses.

Pipe Line Activity

Triangle Drilling Co. Buys Atlas Outlet From Sligo

SHREVEPORT, La.—The outlet of the Sligo field, Bossier Parish, North Louisiana, consisting of a 12-mile, 6-inch line was purchased last week by Triangle Drilling Co. of Shreveport. The operators who have a large share of production in the field, acquired the line from Atlas Pipe Line Co. of Shreveport. Reported consideration was $10,000 cash and $30,000 out of oil. The line terminates at the Atlas trunk line leading to its Shreveport refinery, and the Sligo crude will be processed at that plant.

To Begin Work on Pipe Line Into Rotan Field June 1

FORT WORTH, Tex.—Actual construction of the 12-mile 2-inch pipe line outlet into the Rotan field of Fisher County, West Central Texas, is scheduled to begin June 1. The line will have a rated capacity of 1,400 bbls. A 4-inch will be substituted later if the load justifies.

The Fisher County Pipe Line Co. has been incorporated by a group of Abilene, Tex., men for the purpose of building and operating the line. C. W. Edwards of Rotan will act as president, Letcher D. King of Abilene, vice president, and William H. Waldrop, Abilene, as secretary-treasurer.

The new line will run eastward and connect to the Humble Pipe Line Co. line from the Royston field, for further movement eastward into the Hawley station. A 5,000-bbl. tank is being built there to receive the Rotan crude for subsequent delivery to the Onyx Refining Co. plant 5 miles to the southeast.

Alfred F. Smissen of the French Development Corp. who will leave July 15 for Cuba to supervise oil exploratory work there

Temporary Outlet Provided for Hockley County Crude

FORT WORTH, Tex.—As a temporary crude outlet for the eight-well Slaughter field of Hockley County, West Texas, Humble Pipe Line Co. has agreed to accept the allowable crude trucked from that field into the Bennett pool station, present northernmost terminal of the Humble branch line from its Hobbs and New Mexico system. Previously Humble has been accepting crude trucked from the Duggan and Dean fields of Cochran County into Bennett.

It had been rumored that Humble would lay an additional extension into these northernmost fields in the Permian Basin, but temporarily at least the plan has been abandoned.

Pipe Line Rate Hearing Scheduled for Sept. 4

WASHINGTON, D. C.—The Interstate Commerce Commission's proceeding titled "reduced pipe line rates and gathering charges" has been set for further hearing on September 14 before Commissioner Aitchison. The commission said the pipe line companies had answered the questionnaires sent to them, and that this information had been summarized and was available for distribution to interested parties.

French Government Considering Construction of Pipe Line

Construction of a government-owned pipe line from the Bay of Biscay to Bourges in central France is contemplated by French national defense executives, according to reports from Paris. The project was made possible by the new national defense loan recently made available to France.

INTERNATIONAL NEWS

Mexico Still Unable to Sell Expropriated Oil Abroad

NEW YORK, May 23.—The internal discordant note in Mexico reached a new crescendo last week when the Mexican congress displayed signs of revolting against the extreme leftist policies of President Cardenas. Rumors of a rebellion taking shape in San Luis Potosi under leadership of General Saturnino Cedillo, one of the few remaining Mexican generals maintaining a private army, were regarded sufficiently serious to precipitate a massing of troops in the state and a personal visit by General Cardenas.

Added to the internal woes of Mexico which have mounted with increasing intensity since oil properties of 18 American and British companies were expropriated March 18, is the continued inability of the government petroleum bureau to sell Mexican oil to foreign lands. The petroleum regime is also unable to obtain the technicians necessary to properly supply the internal demand. Sufficient government tankcars are not available to maintain an adequate supply of petroleum products at several strategic points of consumption, and financial ills are growing more serious almost daily.

The congressional revolt against the more extreme Cardenas policies began early last week when the majority bloc went on record against a bill presented by the president that would give federal employes the right to strike. Now a large group in congress is considering launching a call to the nation asking it to support congress in a stand against extreme measures of all kinds, but taking care to state that the move is not against the regime.

Growing concern is evident in all sections of Mexico over the increasing political strength of syndicates. President Cardenas is apparently prepared to go the whole way with the powerful C.T.M., of which the oil labor syndicate is a part, since he publicly announced on arrival at San Luis Potosi that the C.T.M. unions in that state would receive a large measure of power.

Representatives of foreign oil companies sent a joint telegram to President Cardenas denying that the companies had followed a policy tending to overthrow the Mexican government. President Cardenas has asserted in public statements that some of the foreign oil interests whose properties were expropriated March 18 had been "ineffectively trying to bring about a revolution" to favor their expansion policy. The companies' spokesman said they had used only legal methods in attempting to protect their interests and denied that their attitude could in any way merit that "we be accused of seditious acts nor that the president of Mexico publicly accuse us thereof."

Seizure of imports from Mexico was suggested in the House of Commons as a means of reimbursing British nationals for losses in the petroleum expropriation and Sir John Simon, Chancellor of the Exchequer, assured Sir John Mellor, conservative member and originator of the seizure suggestion, that the British government was considering measures for the protection of British interests in Mexico. Sir John pointed out that the trade balance between Mexico and the United Kingdom is heavily in favor of the Central American republic and inquired whether the government would consider establishment of a clearing office to take charge of the surplus proceeds. The clearing office would distribute this money on a prorata basis to those British creditors and property owners whom the government, after judicial inquiry, might consider entitled to compensation.

Two Norwegian ships, Marita and Peter, were reported to have taken on cargo of 211,000 bbls. of oil at Tuxpam last Thursday, but further details were not contained in dispatches appearing in this country's press. In oil circles the two cargoes were believed to be a part of the oil sold to W. R. Davis from properties previously owned by the Mexican government. The Davis deal involved more than 1,000,000 bbls. of Mexican crude oil in exchange for farm implements and other steel goods from Germany. The petroleum bureau was reported to have chartered two other vessels.

An abortive attempt was made earlier last week to establish a counterpart to the East Texas tender board using United States consuls at Mexican ports as the authorities for certifying that certain shipments of Mexican oil came only from nonexpropriated properties.

"We act only in a notarial capacity," declared Consul General James B. Stewart, "and only with regard to documents to be used in the United States. We authenticate signatures, but we have nothing to do with what the document contains. We have no power to make any declarations on our own responsibility."

Mexican papers had reported that to certain shippers of Mexican oil United States consuls would grant certificates that the oil had not come from expropriated United States and British oil fields.

The statement is regarded as important since it indicates that the United States will not interfere in whatever action another nation might take toward embargoing shipments of Mexican oil to Europe or elsewhere. A delegation composed of Alfonso Reyes, who has been appointed an "extraordinary delegate" to represent the National Petroleum Administration and Fernando Galvan, as technical adviser, departed from Mexico City for New York en route to Brazil. The Mexican government has been negotiating for weeks with Brazil in an effort to create a market for its petroleum in that South American country. Nationalization of the Brazilian petroleum industry three weeks ago aroused the impression that some sort of alliance had been worked out.

In sharp contrast to the Mexican president's contentions were remarks by Dr. J. B. Burnett, formerly assistant Mexican manager of Huasteca Petroleum Co., subsidiary of Standard Oil Co. (New Jersey), who explained the oil companies' stand in the controversy on the program of the World Peaceways Forum, which was broadcast last week.

Doctor Burnett declared that the only way the Mexican oil problem can be remedied is by the return of the properties to their rightful owners. "Expropriation," declared Doctor Burnett, "requires effective indemnification for the full value of the properties seized, such payment to be made prior to or simultaneously with the act of seizure. But this Mexico has not done and is unable to do. Mexico already has an external debt of over $970,000,000 which has long been in default both as to principal and interest payments. In addition, her agrarian debt is estimated at around $400,000,000. Furthermore, her total federal income over the past 10 years has averaged only about $100,000,000 annually. Recognition of the inability to pay in accordance with established Mexican and international law recently was officially acknowledged by the statement that the only way Mexico could pay was with oil from the properties seized.

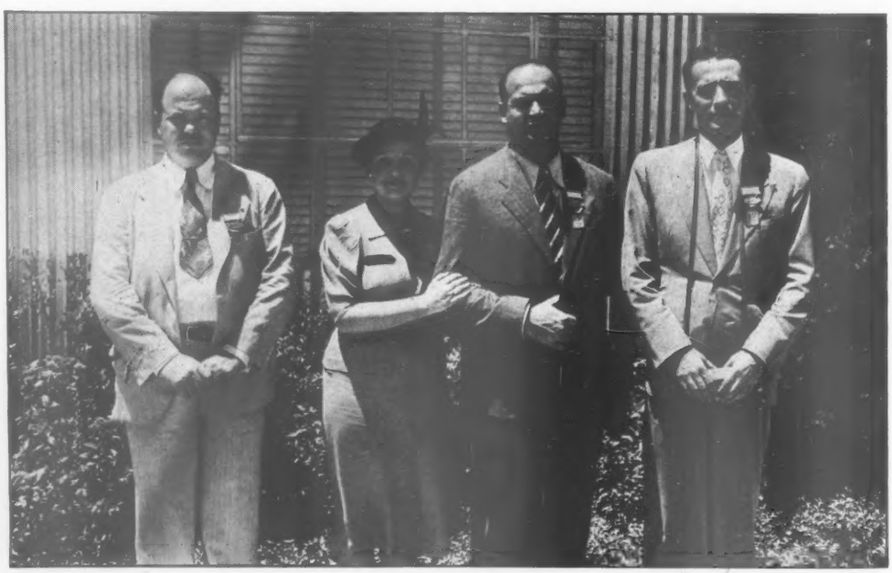
"In view of these conditions the seizure of the oil properties cannot be considered legally as an act of expropriation but rather as outright confiscation and the whole procedure must be branded as a flagrant denial of justice."

Assures New Productive Field On Fringe of Persian Gulf

Another string of casing, 6¼-inch A.I.O.C., is being run for cementing at about 3,670 feet in Kuwait Oil Co. No. 1 Burghan which gives assurance of another productive oil field on the fringe of the Persian Gulf.

Kuwait Oil Co., jointly owned by Anglo-Iranian Oil Co. and Gulf Oil Corp., will soon start another test east of the No. 1 Burghan. The proposed test will be the third drilled on acreage held in the independent kingdom of Kuwait. The first hole, about 50 miles north of No. 1 Burghan, was abandoned last year after drilling to about 7,950 feet without encountering oil or gas in commercial quantities.

The No. 1 Burghan first indicated productive potentialities in the early part of March when it threatened to blowout and produced considerable 34 degree A.P.I. gravity oil in returns. When the high pressure oil zone was first encountered the hole was conditioned with about 700 feet of 15-inch casing. Since that time 11¼-inch casing was set at about 3,000 feet and 8-inch was set and cemented at about 3,150 or 3,200 feet. After the 6¼-inch pipe is set and cemented above the oil zone the well will be more completely tested for productive capacity. The hole is now bottomed at 3,692 feet, 10 feet having been drilled since the first blow-out was threatened.



Mark C. Malamphy, consulting geophysicist; Mrs. Irnack Aramal; Irnack Aramal; Jayme Araujo, in charge of geophysical prospecting, Bureau of Mines, Brazilian government, at the International Petroleum Exposition

ENGINEERING and OPERATING

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ACCURATE DRILLING RECORDS KEPT ON NORTH LOUISIANA WILDCAT
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A North Louisiana wildcat now drilling below 10,400 feet exemplifies the care taken by many operators to obtain geologic information by coring all sands and breaks. The test is being drilled with the most modern type of heavy equipment and very accurate records have been kept of its operation. Time-drilling logs have aided the interpretation of geological data and in determining bit efficiency.

BOTTOM-HOLE PRESSURES AID IN CURRENT OIL WELL OPERATIONS
By C. V. Millikan ..... *Page 44*

Most bottom-hole pressure work has been directed to operations of the field as a whole, but in the future, the author points out, more work will be directed to the operation of individual wells and leases. Here he discusses information that can be determined from bottom-hole pressure measurements and how they can aid in solving various problems and determining reservoir conditions.

REMOVING HYDROGEN SULFIDE FROM GASES BY GIRBOTOL PROCESS
By W. R. Wood and B. D. Storrs ..... *Page 47*

Removal of H_2S from hydrocarbon gases is of increasing importance to the refining industry due to their wider utilization in polymerization and in the synthesis of various organic chemicals. Here the Girbotol process, using aliphatic amines as absorbents, and its use for the simultaneous purification and dehydration of gases are described.

CATALYTIC HYDROGENATION OF OCTENES TO OCTANES ..... *Page 50*

Benefits derived from the use of high-octane fuels in airplane engines are quite pronounced. To meet an increasing demand for these fuels Shell companies have developed a simple economical process for producing iso-octanes. The process operates at low pressures and effects substantially complete hydrogenation of the octane mixture.

USE OF SODIUM PHENOLATE FOR REMOVAL OF HYDROGEN SULFIDE
By G. M. Carvlin ..... *Page 56*

Removal and recovery of sulfur in gases has attracted increased attention of refiners in the past few years. Here theoretical aspects and applications of the Koppers process are described. The process uses sodium phenolate to absorb hydrogen sulfide from refinery and natural gases, the solution being continuously regenerated.

CONSERVATION OF GRAVITY IN PRODUCTION AND HANDLING OF OIL
By S. F. Mauney, Jr., and G. M. Vandaveer, Jr. ..... *Page 74*

Many methods of conserving gravity in oil production and handling are known, but in general appear to be neglected. The authors present estimates showing the gravity and volume losses of crude oil in the Mid-Continent, including savings possible by employing gravity conservation measures in treating and storage of crude oil.

OPERATING KINKS WINNING PRIZES AT N.G.A.A. MEETING ..... *Page 80*

Accurate Drilling on North Louisi

By GEORGE WEBER

THE Magnolia Petroleum Co. No. 1 Sexton Unit, a North Louisiana wildcat, recently attracted attention in passing the 10,000-foot mark. To geologists and operators who are interested in the tri-state area, however, the test has been considered a very important one from the date of its spudding on December 8, 1937. In addition to the local importance attached to the deep test, the methods and equipment employed in drilling the wildcat are of interest to the industry generally.

From the geologic viewpoint, the No. 1 Sexton Unit is a source of much valuable data on the deep formations of North Louisiana. Its geographical location near the Arkansas line makes it a key test, which will indicate the possible extent of the Big lime, now being successfully developed a few miles to the north in the Buckner-Schuler trend of Columbia and Union counties, Arkansas. Upon its success will hinge much of the current interest in extending the lime play into Louisiana. In addition, the deep test is important in that it represents a typical deeper exploration well drilled in a shallow field, the Shongaloo gas field of Webster Parish.

At present the well is drilling below 10,400 feet in black shale with no show of oil after encountering red shale, streaks of sand and anhydrite at 10,265 feet. Twelve thousand feet of 3-inch have been moved to the site and drilling collars are being applied by heat at the well.

In keeping with its importance geologically, the test is being drilled with the most modern type of heavy equipment, and very accurate records have been kept of its operation. The making of time-drilling logs of the well below 4,500 feet has been a valuable practice in aiding the interpretation of geological data and in determining bit efficiency.

A considerable amount of footage has been cored in the deep test, and inestimable time was saved through use of wire line coring. All cores, with the exception of those sent to the Shreveport laboratory for detailed analysis, are kept in an orderly arrangement in the core house on the well site. In addition, cutting samples are taken at each 5-foot interval, and are sacked and kept together with the cores. Through the use of good equipment and sound engineering, a record of only two days down-time has been maintained since the well spudded. One minor lost time in nearly 20,000 man-hours is the safety record on the test.

The wildcat is projected as a Big or Smackover lime test. Its comparative isolation from any other deep tests precludes any definite check on the lower formations. However, it is running higher than the Cotton Valley deep tests, 10 miles to the south, which is expected from the regional geology of the area. Although the section which produces in Cotton Valley was found unproductive in the deep test, it has encountered several shows. A small sand at 8,370-77 feet, a second thin section at 8,390-95 feet and a big sand at 8,892-9,250 feet each showed gas and distillate, with porosities varying from 6 to 18 per cent; 20 feet of the big sand section showing an 18 per cent porosity. The possibility of completion as a distillate and gas producer in that section, should deeper formations prove dry, is considered good.

The utmost advantage in obtaining geologic information was taken in coring all sands and breaks. The practice of taking time logs has aided in this work. The important tops encountered are listed in Table 1.

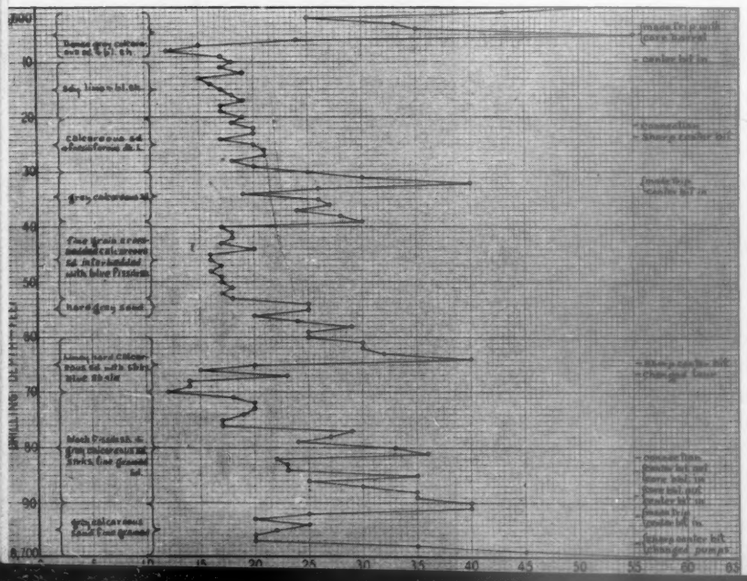
The first indication of hitting the Big lime may be the coring of what corresponds to the Buckner zone in South Arkansas. However, the distance of the test from established sections in the Buckner-Schuler trend makes predictions hazardous. There is a possibility that the wildcat may not encounter any Big lime. It is located about 30 miles due south from the Buckner field, and about the same distance southwest of the Schuler field, the two extremes of the present lime play.

In coring all possible producing sections and all sands below the Blossom, the operators have taken a total of over 50 cores, averaging 7 feet per core. The cores are immediately examined by the geologist and all possible shows are tested with ether. Those cores showing indications of any saturation are bottled for porosity, permeability and saturation tests in the laboratory. A visit to the core house at the drilling site gives a complete picture of the formations cored. The cores are arranged in a series of shelves on racks lining the core room. Each core is designated according to depth and recovery. Equipment for preliminary examination and testing of the samples is furnished in the building.

TABLE 1—IMPORTANT FORMATION TOPS ENCOUNTERED

	Depth, feet
Nacatoch, top	1,790
Chalk, top	2,130
Base Chalk	2,445
Red Beds, top	3,460
First anhydrite	4,175
Massive anhydrite, top	4,348
Massive anhydrite, base	4,652
Anhydrite stringer, base	4,652
Travis Peak, top	5,700
Lower Marine, top	7,605

Section of time-drilling log on Magnolia Petroleum Co. No. 1 Sexton Unit, Shongaloo, La.



Wire line core barrel assembly used exclusively in coring the wildcat, saving many trips and much time and equipment

Use of Time Drilling

The use of time drilling in studying bit performance and in correlating geologic information, is rapidly gaining in popularity. In the case of the Magnolia test, these time-drilling logs have proven to be very informative. The accompanying chart shows an example of the log on the Sexton Unit No. 1, taken from 8,600 to 8,700 feet. With allowance made for the greater time required to drill a foot with a worn bit, the chart of actual drilling time indicates clearly the hard sand sections traversed. The section shown in the column to the left of the chart shows the type of formation drilled. Time consumed in running wire line, making trips and connections, etc., is not shown in the curve, making it representative of actual drilling time only. The reasons for down-time are listed to the right of the chart, and are important in its correct interpretation.

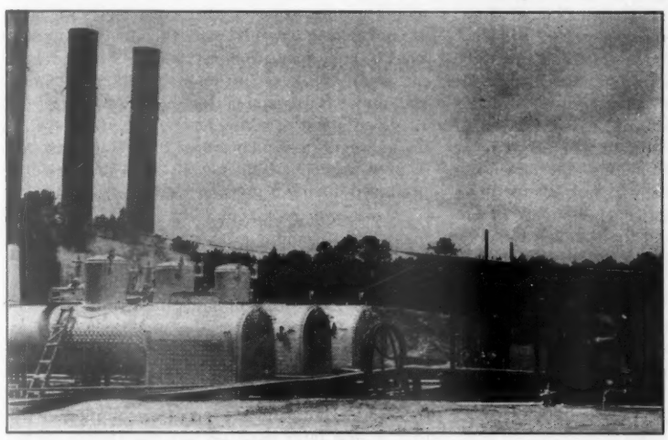
It can be readily seen that the time log shows very accurately the location of hard sand streaks, and the soft breaks which are indicated only by cores and samples. While of enough value to more than justify the

Records Kept ana Wildcat

One of the core racks which line the core house on the drilling site. All cores taken, excepting those sent to the laboratory for porosity and permeability tests, are kept at the well in orderly arrangement

trouble in a wildcat well, the time log serves a more important purpose in field drilling, in the correlation of wells.

An interesting study was made of the bit performance on the Magnolia wildcat by an engineer with the Reed Roller Bit Co., its wire line core barrel being used exclusively for coring in the test. The Magnolia wildcat is the second to be cored with a wire line in that area recently, and results obtained presage increased use in North Louisiana and Arkansas. A section



Three 126-hp. boilers furnish 350-pound steam to the rig

of the hole from 4,560 feet, where coring began, to 6,087 feet was included in the survey of bit performance and cost. Results are shown in Table 2.

Due to the extreme hardness of some sections below 8,000 feet, the average length of cores taken was much more than for the section represented in the survey. In some cases 1 foot of sand would wear a cutter head completely off, but that foot of core would be recovered. In such cases the use of the time log was helpful in determining when to change bits.

Engine and Drawworks Changed

When it became apparent that the test would go below 10,000 feet the 12 by 12 engine and heavy drawworks were changed and a 14 by 14 engine was installed with heavier drawworks and auxiliary equipment. The rig now drilling on the wildcat came originally from Coastal Louisiana. Two 8½ by 15 by 20 mud pumps, three 126-hp. boilers generating 250-pound steam, and a 136-foot derrick were among the original equipment on the test. At 10,000 feet eight lines were being used with an 80-inch block and a 9-inch drumshaft on the drawworks, but the next change in lines, which is made each 25 trips, will entail stringing 10 lines.

The mud is kept in good condition with a vibrating screen, and the surface connections are equipped with a blowout preventer topped with an O.C.T. head. The circulating setup includes two standpipes, one of which serves a Bowen circulating head. This head is connected to the top of the drill pipe while running the wire line, thus continuing circulation and avoiding chances of mud cutting while retrieving cores.

Casing Program

A surface string of 13⅜-inch casing was set and a protective string of 9⅝-inch casing was cemented at 6,814 feet, 1,114 feet into the Travis Peak formation. From 6,814 feet down to the present depth, the hole measures 8¾ inches. Although the sands cored at 8,370-9,250 feet showed gas and distillate, no threat of mud cutting has been encountered. During the two days required to change rigs, some gas was noticeable in the mud, but circulation quickly corrected the condition. Racked at the well site at present is 10,700 feet of casing to be set in the hole when needed. It consists of enough 7-inch upset-joint casing to set down to the bottom of the protective string, and in addition several hundred feet of 7-inch, 28-pound Standard Extreme Line Simancro casing, tested to 2,800 pounds.

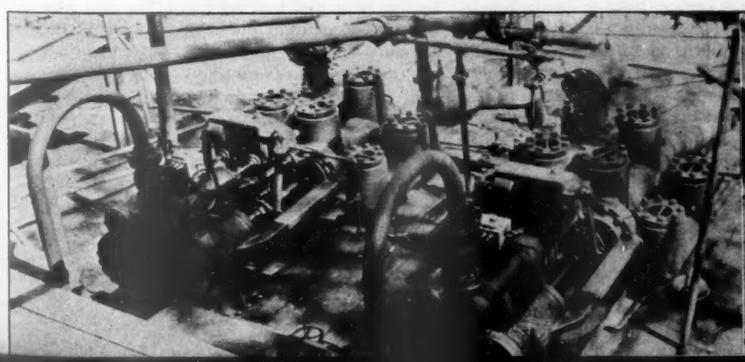
During the early stages of drilling the test made most of the mud requirements, but weight material was added to the mud at about 6,800 feet. At 10,000 feet about 40 to 50 sacks of artificial mud was being added daily. This keeps the mud at a weight approaching 11 pounds, and the viscosity is maintained at 26. A high bottom-hole temperature estimated in excess of 250° F. makes a constant check on the mud necessary.

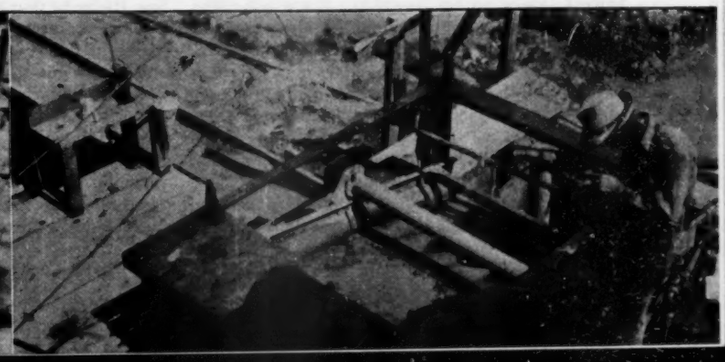
TABLE 2—PERFORMANCE AND COSTS OF CORING OPERATIONS

Cores: Performance	
Drilling, coring range, feet	4,560-6,087
Total number cores cut	35
Total footage cored, feet	316
Total footage recovered, feet	234
Average length of core cut, feet	9
Average length of core recovered, feet	7
Average time required to take core	1:43
Average percentage of recovery	74
Cores: Cost	
31 cores @ $17.50 ea.	$542.50
33 core cutter heads @ $5.00 ea.	165.00
3 H.F. core catchers @ $3.00 ea.	9.00
Total core costs	$716.50
Avg. cost per core	23.20
Avg. cost per foot cored	2.26
Bits: Performance	
Total number 12¼-inch H.F. bits used	15
Total footage made	1,468
Total number hours run	339
Avg. footage per bit	98
Avg. number hours run	22.6
Avg. drlg. speed, ft. per hr.	4.3
Bits: Costs	
15 12¼-inch H.F. bits @ $148.00 each	$2,220.00
Avg. hole costs per ft. drld.	1.51
Avg. cost per ft. incl. coring and bit cost for 1,468 ft. of hole	2.00

Note: Time element, as shown under bit performance, includes time consumed in running wire line in and out of hole while retrieving the core barrel and center bit. If this time were deducted, the actual drilling speed would be about 20 per cent better than shown.

Two 8½ by 15 by 20 mud pumps (left) serve twin standpipes and give continuous circulation during drilling. A vibrating screen (right) keeps the drilling mud in good condition. Cutting samples are taken at least every 5 feet





Bottom-Hole Pressures in Current Oil Well Operations

By C. V. MILLIKAN
Chief Engineer, Amerada Petroleum Corp., Tulsa, Okla.

Bottom-hole pressure measurements had their first application in oil field development in 1930 and their use was greatly expanded in 1931. Since then their measurement has become common practice in many fields. Most of the bottom-hole pressure work has been directed to the operation of the fields as a whole and to problems primarily of a technical nature. Less has been done with the object of solving current oil-well operating problems. It is in this direction that application of bottom-hole pressure measurements have greatest opportunity for expansion.

The application of pressures to operating problems is not new. In fact, it is as old as producing problems. Only the precise measurement of effective pressures is new. Tubing pressures and casing pressures of flowing wells have always been important factors in operating wells, and under restricted production their importance is increased. Changes in these pressures correlated with age or with rate of production have been considered as giving important information as to the quality of the well, sand conditions, conditions of the bore hole through the sand, and whether the equipment in the hole is operating properly. The reasoning which leads to such interpretations is sound but too often the pressures are misleading. Changes in fluid level, specific gravity of the fluid, or gas-oil ratio cause changes in surface pressures which may not represent changes at the bottom of the hole. Since it is the difference between the pressure back in the sand and the pressure in the hole at the face of the sand that causes the well to produce, a change in this differential pressure results in a change in rate of production. When interpretations are based on pressure changes at the bottom of the hole where variations of fluid level, specific gravity or gas-oil ratio have no effect, they are much more dependable.

A general study of bottom-hole pressures throughout an entire field has a direct application to the operation of a particular lease or an individual well. Bottom-hole pressure surveys of the field will provide data which will assist in making a more accurate estimate much earlier in the life of the field of the time when wells must be produced by artificial lift and of the amount of fluid that will have to be handled. It is of considerable value to know within reasonable limits when the wells will have to be pumped. It is useless to install pumping equipment years in advance of its requirement, but on the other hand it is not desirable to wait until the wells are dead. When bottom-hole pressure surveys indicate that the volume of fluid to be handled will be small, the type and size of equipment may be quite different from that selected when the quantity anticipated is large.

After a few wells in a field have produced at full capacity, the same well can be produced at one or more lower rates and the bottom-hole pressure measured. Curves can then be constructed showing the correlation between the open flow capacity, low rate of production, and bottom-hole pressure while producing at the low rate, and the reservoir pressure. These curves can then be used to determine the open flow capacity of any other well in the same field using the bottom-hole pressure at some known low rate of production and the shut-in pressure. When conditions will not permit open flow tests, an open flow capacity estimated from a low rate of production and the bottom-hole pressure will be more reliable than estimates based on low rate production tests using surface pressures only.

A bottom-hole pressure flow test will give the productivity of the well which will be unaffected by friction through the flow pipe, chokes, surface connections and equipment. A flow test is made by measuring the pressure decline from the static pressure at the face of the sand during a known rate of flow. Such a test will furnish information from which many characteristics of the reservoir and of the individual well can be deduced. The data thus obtained make it possible to estimate the quality of the producing reservoir, to indicate changes in the sand close to the bore hole, and to indicate whether equipment in the hole, especially screen or liner, is effectively serving the purpose for which it was installed. Flow tests will also provide the best information on which to base an explanation of the cause of any change in well performance at a future time. The actual conditions in a well can be determined more quickly and more definitely with the aid of bottom-hole pressures than by production tests only.

A.P.I.—Presented at Mid-Year Meeting, Wichita, Kansas, May 24, 1938

When an oil sand is drilled with rotary tools more or less water filters out of the mud into the porous sand. The presence of water in the face of the sand reduces the ability of the well to produce. The amount of water entering the sand, and therefore the reduction in productivity is dependent on the sealing property of the particular mud, the length of time the mud remains against the sand, and the weight of the mud in excess of that necessary to counterbalance the pressure in the sand. When the well is produced, the infiltrated water will be gradually removed and the permeability of the sand will return to normal. Under very low rates of flow this may require several weeks. Therefore, the first productivity test should not be made until the sand is cleared of the water that may have filtered in from the mud during drilling.

A well which produces from several feet of good oil sand extending over considerable area would be called a good well. When such a well is opened or the choke is changed the rate of production and the bottom-hole pressure will become stable in a short time. When the well is shut in the bottom-hole pressure will build up to the maximum within a few hours. A well producing from a thin sand when opened will have a sharp decline in the bottom-hole pressure, followed by a slower rate of decline which will continue for several hours or possibly days before it becomes stable. The rate of production will also decline, but may not be as pronounced as the decline in bottom-hole pressure. When the well is shut in the rate of buildup will be quite slow, especially after the first few hours. A well may have sufficient thickness of good oil sand to be a good producer, but its extent may be too small for large ultimate production. Such a well may have a good bottom-hole flowing pressure curve on a test of a few hours, but would weaken on a longer test. The closed in static pressure decline would be high for the total amount of oil produced during a given period.

A reservoir rock should maintain its actual permeability throughout its producing life. An apparent change may occur due to change in viscosity of the oil, change in gas-oil ratio, or presence of water. Deposition of salts, paraffin, or possibly sediment filtered out of the moving oil and gas may cause partial blinding of the openings and the permeability will decrease materially. If such conditions occur they can be determined by comparing the productivity index soon after completion with that at the later date. When the change in productivity is more than can be accounted for by change in viscosity, gas-oil ratio, or water, a small shot, acid treatment or paraffin removal, and cleaning out may return the productivity to its original value. If the test shows no change in the productivity, cleaning out or other treatment cannot be expected to increase production.

The question of whether production from a flowing well can be increased arises frequently. In many cases it is believed that the production is flowing only from the top of a high fluid level. Such a condition is more likely to exist in a well that is producing through casing where the reservoir pressure and the gas-oil ratio are low. If the reservoir pressure is high and the bottom-hole pressure while flowing is low there is little chance of increasing the rate of production by changing the method of production. It is much cheaper to test with a bottom-hole pressure gauge than to change the method of producing which a test would have shown to be unnecessary. If the bottom-hole pressures indicate that a change in the method of producing is advisable, the same data will serve as a guide as to what change should be made.

Accumulation of water in the bottom of the hole is frequently the explanation given for rapid decline in production. Water may accumulate in the bottom of a well produced at a low rate through casing, in sufficient quantity to build up enough pressure to retard production. Sufficient water to retard production is not likely to accumulate in a well producing through tubing except when the rate of production is extremely low. Accumulation of water between the casing and tubing will not retard production. It cannot build up a pressure head higher than at the bottom of the tubing. The pressure at the bottom of the tubing in any given well is dependent on the rate of flow and such

pressure must be balanced by pressure between the casing and tubing. This pressure may be due to gas, a column of oil, a column of water, or as is generally the case, a combination of these. When a detrimental accumulation of water is suspected to be present, its presence can be readily determined with a bottom-hole pressure gauge. Pressures are measured at regular intervals of depth, for example, every hundred feet, and water, if present, will be determined by the higher pressure head for a given interval.

It is not uncommon for the hole through the producing formation to be filled with cavings sloughed from the walls. The rate of production may or may not be affected. The debris may be so loose that the resistance to flow is too small to be measured. If a flowing bottom-hole pressure measurement shows that the productivity has declined, the well needs cleaning out, but if there is a change in the ability of the well to produce, cleaning out would be a useless expense.

Unconsolidated Sands

Production from unconsolidated sands presents opportunities for bottom-hole pressure studies in many ways that are not of so much value in harder producing formations. Wells in such sands cannot always be produced safely at a rate high enough to obtain all the desired information. Perforated or slotted liners, screens, and perforated casing add further complications in determining cause of production difficulties.

In fields producing from unconsolidated sand it is dangerous to produce at too high a rate because of the possibility of bringing in sand which would cut the screen or liner, cut surface chokes or connections, or possibly sand up the well. The rate of production which will produce sand is dependent on the velocity of flow through the sand which in turn is dependent on the difference in pressure between the reservoir and the well. In some areas, especially the Gulf Coast, such danger is always present and not often enough guarded against wisely. It has been more or less commonly accepted that any well can produce safely through a one-fourth inch choke. Inasmuch as movement of sand is due to velocity of fluid through the sand, there is a maximum safe differential pressure to use in producing each well, which will have a relation to rate of production of a differential well only when the permeability and thickness of the sand are the same. Therefore, it may be unsafe to produce from the thin sand of one well through a choke larger than one-eighth inch, while another well, with thicker sand, may produce with safety through a one-half inch choke. A few carefully conducted bottom-hole pressure flow tests in a field will establish within reasonable limits the differential flowing pressures that can be used safely.

The rate of production of a well may be reduced as a result of the screen or liner or perforated casing being partially clogged. The reaction of the bottom-hole pressure to changes in rate of flow when such a condition exists is characteristic. The pressure will drop rapidly to equilibrium when the well is opened. When shut in the bottom-hole pressure will increase at nearly a constant rate until the maximum is reached. If the rate of flow is not affected by blinding of the liner, screen or perforated casing, the pressure decline when opened up will be slower and when shut in the rate of buildup will be fast at first, but becomes slower as the maximum is approached. The condition can be more readily recognized if flow tests have been made before the partial clogging or blinding occurred.

Artificial Lift Operations

Bottom-hole pressure determinations are of as much value in the current operation of wells producing by artificial lift as in wells flowing naturally. Here also pressure observations have always been an important part of the operating procedure, but the pressure, instead of being expressed in terms of pounds, have been expressed in terms of fluid level, rate of fill, or rate at which the fluid can be bailed down. Conclusions can be drawn from these observations, as for flowing wells, regarding the quality of the well, reservoir sand conditions, condition of the bore hole through the sand, what lifting equipment to install, or if installed, whether it is operating properly. Fluid level measurements may be misleading because of the unknown and varying amount of gas in the fluid. When the fluid level and rate of fill are determined with a bottom-hole pressure gauge, which is not affected by the gas pockets in the fluid, the same interpretations can be made but with greater confidence because such pressures are measured at the face of the sand where pressure changes have a direct relation to rate of production.

Where wells which will not flow naturally are being completed with cable tools it is often valuable to make several production tests during drilling of the sand. A test ordinarily requires swabbing for several hours. Much swabbing time with accompanying cost can be eliminated by determining the rate of fluid buildup with a bottom-hole pressure gauge. After the fluid is swabbed down the gauge is run and allowed to remain for one or two hours. The amount of fill in barrels as calculated from the increase in pressure will be a reasonable gauge of the well. Such gauges are fairly reliable for rates up to 30 or 40 bbls. per hour unless the sand is very loose and the reservoir pressure low.

Producing pressures can have a particularly important role in pumping wells. When a well stops flowing the question arises as to how much it will produce on the pump. Pressure records during the flowing life can be a valuable aid in estimating how much oil can be pumped from the well. If the sand is tight and has average or higher gas-oil ratio with good reservoir pressure the well will probably make no more on the pump than it was producing at the time it stopped flowing. A well with a sand of high permeability, a lower than average gas-oil ratio, and a low bottom-hole pressure is likely to produce more than it was producing at the time it stopped flowing. Occasionally such a well is capable of producing sufficient fluid to justify installing gas lift or some other means of lifting which is capable of handling more fluid than a beam pump. If static and flowing bottom-hole pressure tests which can be used to estimate the amount of oil are not available it may be worth while to make tests such as described above for wells which are being completed with cable tools. A more positive test can be made by putting the well on the pump temporarily, with a recording pressure gauge in the anchor. The short time required to make a test is cheap insurance against installing equipment which is not suitable to lift the production from the well.

Acid Testing and Shooting

It is often desirable to shoot, or in a lime reservoir to treat with acid before putting on the pump, especially those wells which are put to pumping immediately after completion. Shooting or acid treating lime or both are justified by the resulting increase in immediately available oil. A preliminary test of the well may show that it is already capable of producing a greater quantity of fluid than the pumping equipment can lift, and there would be nothing gained by an increase. An acceptable preliminary test may be run as described above for wells being completed with cable tools, but a better check would be by a bottom-hole pressure pumping test.

When a well is put on the pump it may not produce as much fluid as was expected, especially if good preliminary tests have not been made. A pumping test with a pressure gauge in the anchor will prove whether the deficiency is in the ability of the well to produce the oil or in the ability of the equipment to handle the available oil. When a well is pumped with a recording pressure gauge in the anchor, changes in fluid level while pumping will be shown by corresponding changes on the pressure chart. If the fluid level lowers almost to the working barrel it may be accepted as conclusive proof that all the available fluid is being pumped. If the fluid level remains relatively high, more fluid is available. Generally, an acceptable estimate of the amount of additional available fluid can be calculated by assuming that the production will continue to increase in the same ratio as the lowering of the fluid level. In some fields due to the depth of the wells, working fluid level, sand conditions or very thick sand zones the working barrel may be some distance above the normal point at which bottom-hole pressures are measured. In such wells if the producing pressure is to be corrected to some lower point in the hole, the adjustment must be made on the average weight of the head of the gas and oil mixture, and not on oil head only as under static conditions.

In General

The results obtained in bottom-hole pressure measurements in the examples referred to have been those that might be expected under ideal conditions. It must not be assumed that actual tests can always be interpreted as clearly as the examples. There will be as many variations as there are tests. A knowledge of sand conditions as interpreted from drilling, cores, and electrical logging are valuable in interpretation of pressures. Casing and tubing pressures, misleading as they may be, will have some influence on interpretations. The structural position may have some influence, but in general it has not. The essential data for interpretation of bottom-hole pressures are the production record of the well and the history of bottom-hole pressures in that well and adjacent wells.

All oil produced is the result of pressure differences between the producing formation and the bottom of the hole. These pressures are basic and any operating procedure depends on these pressures for its accomplishment. Therefore, bottom-hole pressure measurements have a definite and important part to play in the operation of the wells.

"Price and Price Policies"

A new volume dealing with reports prepared at the instigation of the president of the United States, under the general supervision of a cabinet committee on price policy, has been recently published by McGraw-Hill Book Co. The book was written by Walton Hamilton, professor of law at Yale University, and several others. The reports deal with seven separate commodities and give the results of investigation of the structures, habits and patterns of control and the complex arrangements which underlie prices in the industries which they represent. An introductory and a concluding chapter tie the reports together and focus them upon the issues in the price policy with which the nation is at present confronted.

One chapter of the volume is devoted to gasoline, in which such topics as price wars, public regulation and the courts versus petroleum are discussed. Other reports included in the volume are on the automobile, the automobile tire, cottonseed, dresses, whisky, and milk. Copies of "Price and Price Policies" are available from McGraw-Hill Book Co., Inc., 330 West Forty-second Street, New York, at a cost of $4.

Progress in METALS

By W. L. NELSON

Cast Steel as a Material of Construction

Most of the claims of advantages that are made for various metals or alloys, or for methods of fabrication, are based upon the usefulness of a finished article for a particular service. Thus, claims of advantages rarely reach the reader with the same broad background of experience that is available to the man who is stating the claim. For this reason many unjust conclusions may be drawn from honestly stated discussions. The article published here, by H. D. Phillips of Dodge Steel Co., Philadelphia, Pa., is a plea for the exercise of more judgment in weighing the relative merits of materials and fabrication methods.

That steel castings are an economical material of construction has been proven beyond doubt. They have played a large and satisfactory part in the growth of modern industry; in rail and marine transportation; in the machine and automotive industries; and repeatedly

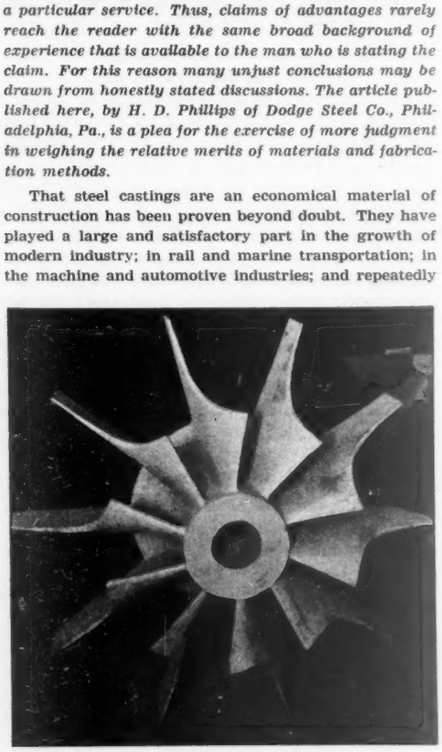


Fig. 1—Ideal application for cast iron

have proven their ability to resist the severe stresses and hard usage imposed upon them in service. During some years, including 1937, the steel foundry industry has sold over a million tons of castings.

In recent years the development of the welding process as a tool of construction has made inroads into what formerly have been markets for steel castings, partly because it has a place in industry and partly because of exaggerated or false claims for the process, such as the one recently made comparing the relative physical properties of arc-welded steel and castings, to the effect that, "steel is five times stronger than castings," thereby giving the impression that parts assembled by welding are stronger than all kinds of castings. Obviously, this is not true of steel castings, in fact, it is hardly true of any of the weaker ferrous castings, into the markets of which welding has made some very considerable encroachments. If this statement is in error, and it undoubtedly is, it is cause to wonder what errors may be found in other claims made concerning the merits of arc-welded parts. The steel foundry, however, has no quarrel to pick with welding, in fact the welding machine is an important piece of equipment in any foundry, its use by trained operators resulting in the saving of many castings otherwise scrapped for minor surface blemishes or defects.

In order to clarify the relative positions of steel castings and welded construction, the following discussion presents the casting side of the story.

The steel used in castings must be of a higher quality than that generally used for other purposes because a steel casting receives no mechanical working. Likewise, the control of the chemical analysis must be more exact because of the inability to stock "off-composition" heats against a future odor. Deoxidation must also be controlled carefully because any porosity in the casting will not be closed by subsequent working. Likewise, inclusion control must be of a high order as no mechanical working will serve to elongate any of the injurious types of inclusions and thus allow them to exert but little detrimental influence on the worked steel when longitudinally loaded. The accuracy with which these factors are controlled can easily be seen by examining the records of any competent steel foundry.

There can be no denying that difficulties have been found with steel castings in some few cases, as they are occasionally encountered in all materials, but the fault in many cases lies with the design. Intricacies of design and the demand for abnormally rapid delivery are responsible for most steel foundry difficulties. It is for this reason that the foundrymen so often stress the desirability of consultation between design engineers and the foundry personnel, as well as a more forehanded purchasing policy.

Engineers of the more progressive organizations are today consulting with the foundry in the matter of design and enlarging their knowledge of the remarkable adaptability of steel castings to their needs. They have found that cast steel, besides possessing high rigidity and low internal stress, and besides its availability in almost any desired shape, can be readily welded to other steel castings, or rolled shapes; can be easily machined; will resist corrosion, oxidation (at either low or high temperatures), and abrasion when suitably adjusted by chemical composition and/or heat treatment; and in every way possesses much the same physical properties as rolled or forged steel. Figure 1 illustrates many of these features.

Its ability to be cast in almost any desired shape to close dimensions and the fact that metal can be placed where needed at little additional expense is a property very much in its favor. Castings are also particularly suited for stream-line types of design and in many instances stream-lining is such an important feature that it alone will justify the use of steel castings.

Modern knowledge and scientific control of molding mediums, and the behavior of metals prior to and during solidification has progressed to the point where the founding of steel is almost an exact science. As most steel castings might be likened to poorly designed ingots, the competent foundryman can, by exercising his ingenuity, use external chills and/or feed heads and secure

Fig. 2—Typical steel casting

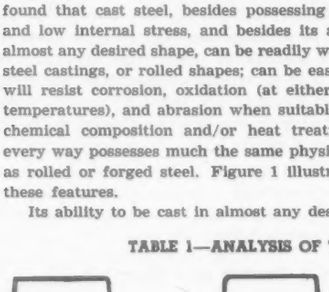
the same conditions that exist in a big-end-up ingot, namely, directional solidification and as a result, metallurgical soundness, thus producing a material that is truly isotropic.

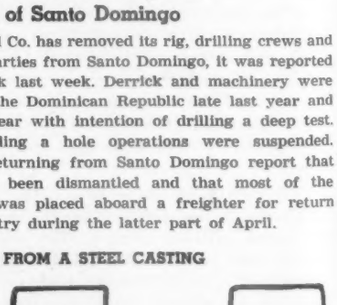
An idea of the soundness and uniformity of a typical steel casting can be gained by referring to Table 1 and Figure 2. Samples of metal from the bend shown in Figure 2 were examined for the data given in Table 1. The specimens were taken at the points marked on the drag and cope sketches which are shown as a part of Table 1. The analysis of the steel was carbon 0.24 per cent, manganese 0.68 per cent, silicon 0.30 per cent, phosphorus 0.032 per cent and sulfur 0.034 per cent.

Skelly Oil Co. Moves Rig and Crew Out of Santo Domingo

Skelly Oil Co. has removed its rig, drilling crews and geological parties from Santo Domingo, it was reported in New York last week. Derrick and machinery were shipped to the Dominican Republic late last year and early this year with intention of drilling a deep test. After spudding a hole operations were suspended. Travelers returning from Santo Domingo report that derrick has been dismantled and that most of the machinery was placed aboard a freighter for return to this country during the latter part of April.

TABLE 1—ANALYSIS OF TYPICAL SPECIMENS TAKEN FROM A STEEL CASTING





Specimen taken at points	Yield point (lb./sq. in.)	Tensile strength (lb./sq. in.)	Elongation (%)	Reduction of area (%)
1	39,050	71,630	26.0	48.4
2	37,750	71,850	26.5	45.7
3	39,550	72,200	26.5	46.6
4	38,050	70,950	31.0	53.1
5	39,100	73,300	26.5	45.9
6	37,550	71,500	30.5	52.4
7	39,350	73,200	26.0	45.7

Removal of Hydrogen Sulfide from Refinery Gases by Girbotol Process

By W. R. WOOD and B. D. STORRS
The Girdler Corp., Louisville, Ky.

Removal of hydrogen sulfide from hydrocarbon gases is a process of growing importance at the present time. In the refinery field, polymerization, the production of liquefied hydrocarbon gases, the synthesis of isooctane, hydrogen, and various organic chemicals such as the aliphatic alcohols, all are improved by the use of sulfur-free starting materials. In some instances catalysts are injured by hydrogen sulfide. In others, expensive after-treatment or methods which impair the quality of the finished product must be resorted to if hydrogen sulfide is present in the charge. In all cases the corrosive effects of hydrogen sulfide on the process equipment are eliminated by its removal. As new methods for converting the lighter components of refinery gases into marketable products are developed, removal of hydrogen sulfide will become increasingly necessary because hydrogen sulfide, due to its vapor pressure, tends to accumulate with these more volatile fractions. The Girbotol process* is an efficient method for removing hydrogen sulfide and other weak acidic gases from gas mixtures.

Theory and Description of Process

The Girbotol process originated with the discovery that acidic gases such as hydrogen sulfide and carbon dioxide react with certain amines to form compounds which may be broken down by heat. This reversible reaction may, in the case of hydrogen sulfide, be represented as follows:

$$RNH_2 + H_2S \rightleftharpoons RNH_2HS$$

Where: R represents an organic residue.

The equilibrium proceeds to the right or left depending on the temperature, and on the partial pressure of hydrogen sulfide. In a Girbotol plant, hydrogen sulfide is washed from a gas mixture at one temperature at the beginning of the cycle and expelled from the amine solution at a higher temperature in a subsequent part of the cycle. Water solutions of the amines are usually employed. The cycle is continuous, and the hydrogen sulfide is recovered in concentrated form.

Fig. 1 shows a typical flow diagram of the Girbotol process. Sour gas containing hydrogen sulfide flows into the base of the absorber, which is a bubble plate or packed tower. Lean amine solution enters the absorber near its top and flows in countercurrent relation to the rising gas, absorbing hydrogen sulfide in its downward passage. Gas free from hydrogen sulfide leaves from the top of the absorber.

Rich amine solution containing the removed hydrogen sulfide flows by absorber pressure, or is pumped, from the base of the absorber through the heat exchanger, and thence into the upper section of the reactivator. If the treating pressure is high, and if an extremely pure hydrogen sulfide is desired, a flash drum, operating at a lower pressure than the absorber, is placed between the absorber and the heat exchanger for releasing hydrocarbons dissolved in the solution due to the high treating pressure.

The reactivator is a bubble plate or packed tower. In or near its base there is the reboiler, which is an indirect heating element supplied with low-pressure steam or other suitable medium for boiling the amine solution and expelling the hydrogen sulfide. As the solution flows down through the reactivator, it is heated by ascending steam generated by the reboiler, and the hydrogen sulfide is expelled. In the reboiler the solution reaches its boiling point, slightly above the boiling point of water at the pressure of the reactivator.

Regenerated amine solution free from hydrogen sulfide is pumped from the base of the reactivator through the heat exchanger, then through the solution cooler, and back to the top of the absorber.

Hydrogen sulfide and steam flow together from the top of the reactivator to the hydrogen-sulfide cooler, where the temperature of the mixture is reduced to atmospheric and the steam condensed. The condensate returns to the top of the reactivator, and concentrated hydrogen sulfide flows from the cooler.

All of the equipment is standard, similar in design to a refinery absorption plant.

The plant is made fully automatic in operation by the use of suitable control equipment. No labor is required during routine operation except for control tests and for normal maintenance. The utilities needed for operation are exhaust steam, or its equivalent, for heating, water for cooling, and power for pumping the solution. Mechanical losses of amine solution are small, and the amine itself lasts indefinitely. Vaporization losses with monoethanolamine, a comparatively volatile amine, are as low as one-tenth of a pound per million feet of gas treated.

The Girbotol absorbents are not corrosive toward steel or iron. Because the solutions are alkaline at all times, the corrosive effects of hydrogen sulfide are practically negligible. Low-carbon steel and cast iron are suitable construction materials for all portions of the plant, and no special alloys are required.

A number of amines suitable for use in the Girbotol process are available commercially at reasonable cost. Since each differs slightly in its physical properties from the others, there is a group of absorbents from which the proper amine may be selected for any particular purification plant. All of the amines which are used have the desirable characteristics of high capacity for hydrogen sulfide and carbon dioxide, rapid rate of reaction with the acidic gases, and low volatility. These amines are miscible with water in all proportions. Because the amines have high capacities for acidic gases, dilute water solutions may be circulated. This results in a small initial expenditure and low replacement costs for the reagent.

The amines are organic bases, derivatives of ammonia; and, like ammonia, react rapidly with acidic gases such as hydrogen sulfide and carbon dioxide to form hydrosulfides and carbonates. Until a high percentage of the available amine has been neutralized, the resulting solution has a negligible acid-gas vapor pressure. By carrying out the absorption in a counter-current contactor, the acidic component of a gas stream may be stripped out completely.

A Girbotol absorbent is a single component. There is no exact pH† or acid-alkali balance to be maintained in the absorbing solution. This is important where there is a gradual accumulation of a fixed acid in the solution, as for example the accumulation of thiosulfuric acid in solutions scrubbing hydrogen sulfide from a gas containing traces of oxygen. The effectiveness of the available absorbent is not altered by partial neutralization of the solution or by variation in solution strength. There are no volatile components to pollute the purified gas. Plant-control tests are elementary.

When the temperature of the amine solution is raised, its capacity for acid gas falls off rapidly, and a solution containing acid gas may be completely regenerated by bringing it to its boiling point. Regeneration can be accomplished by boiling the amine solution in a simple evaporator or pot still. However, the use of a column for regeneration is more economical, inasmuch as it reduces the steam consumption materially.

The reactivator in a Girbotol plant is primarily a unit of heat exchange. When a fixed gas such as hydrogen sulfide is driven from a water solution, it is saturated with steam at the temperature at which it leaves the solution. The lower this temperature, the smaller the amount of steam carried by the gas; and, inasmuch as heat must be supplied to the reboiler in proportion to that carried away by the steam, it is desirable to have the gas

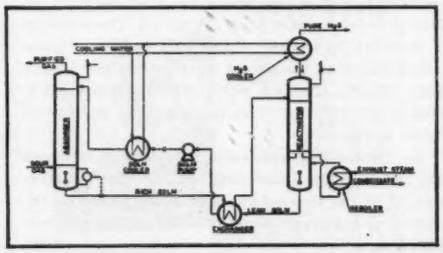


Fig. 1—Flow diagram of Girbotol process

***A.P.I.*—Presented at Mid-Year Meeting, Wichita, Kansas, May 24, 1938**

*Patents on the Girbotol process are owned by The Girdler Corp., Louisville, Ky.

†Hydrogen-ion concentration.

leaving the reactivator at a relatively low temperature. On the other hand, the top temperature of the tower cannot be too low, because heat must be supplied to bring the descending solution to its boiling point. A simple calculation shows that for each treating condition there is an optimum feed-plate temperature to balance latent heat of effluent steam and sensible heat of amine solution. Because of the ease with which acidic gases are liberated from the amines due to the loose chemical bond, Girbotol reactivators are designed and operated with the proper temperature gradient down the tower for minimum heat consumption. This design and operation result in a considerable saving in heat and in cooling water, inasmuch as a heat balance on the plant shows that the cooling-water requirement is directly proportional to the heat supplied to the reboiler.

Application of Process

At the time of writing there are four Girbotol plants completed or under construction for removing hydrogen sulfide from refinery gases, and seven plants for purifying natural gas. There are also five Girbotol plants for scrubbing carbon dioxide from hydrogen produced by reacting hydrocarbon gas with steam. The hydrogen-sulfide plants are designed for a wide variety of treating conditions. Volumes vary from ½ million to 40 million cubic feet per day, pressures from 30 lb. to 550 lb., temperatures from 50 to 160 deg. F., and hydrogen-sulfide concentrations from 25 to 3,000 grains per 100 standard cubic feet. In all Girbotol plants which have been placed in operation, the hydrogen-sulfide removal is better than 99 per cent. The high efficiency of the process is best illustrated, however, by the fact that the carbon-dioxide content of industrial hydrogen is reduced from 18-20 per cent to practically 0 to a single absorber of normal height.

In some cases, particularly in the treatment of natural gas, it is desirable to remove not only the hydrogen sulfide, but also the water from the gas. This is accomplished by substituting a dehydrating agent for water in the Girbotol solution. Diethylene glycol is the agent being used at the present time.

Dehydration prevents the formation of hydrocarbon hydrates in transmission lines and the attendant reduction in line capacity. A number of dehydrating processes are in use. Diethylene glycol has great affinity for water, and is one of the most satisfactory hygroscopic agents employed. It is non-corrosive and practically non-volatile, and stable at reactivation temperatures.

The Girbotol amines are completely miscible with diethylene glycol, and a mixture of these compounds removes both hydrogen sulfide and water from a gas stream. The operating cycle is identical with the usual Girbotol cycle, except that the reactivator is operated as a fractionating column to remove water from the glycol. The presence of evolved hydrogen sulfide in the reactivator assists in drying the glycol, so that the combination plant reduces the dew point of the treated gas to a lower temperature than is reached by diethylene glycol alone.

By controlling the ratio of diethylene glycol and water in the absorbing solution, the moisture content of the treated gas may be adjusted to any desired point from complete saturation to practically zero.

The hydrogenation of oils consumes large volumes of relatively pure hydrogen. This gas is generally produced by reforming and converting hydrocarbon gases to a mixture of hydrogen and carbon dioxide (18-20 per cent) by the action of steam in the presence of a suitable catalyst, and then removing the carbon dioxide. The Girbotol process offers an economical means for reducing the carbon-dioxide content to practically zero in a cycle which is identical with the hydrogen-sulfide cycle. Separation with the amine solution is carried out at relatively low pressures, and the carbon dioxide is completely eliminated with small volumes of absorbing solution.

In hydrogenation plants where sulfur-free gas is not available, the Girbotol process serves two purposes. It removes hydrogen sulfide from the hydrocarbon gas used for the production of hydrogen to prevent catalyst poisoning, and it removes carbon dioxide from the finished hydrogen. Such a plant may be built as a combination unit consisting of two absorbers and a common reactivator.

Within the scope of this paper it is impossible to describe all of the applications of the Girbotol process. Other uses, such as the recovery of carbon dioxide in dry-ice plants, the recovery of hydrogen sulfide, the purification of gas-engine fuel, and the production of inert atmospheres, have not been discussed. The Girbotol process is a simple, unusually efficient process, applicable whenever it is desirable to remove or recover acid gases from gas mixtures. Its field of usefulness is being constantly expanded.

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Overflow System Enlargement Being Completed by Gulf

By F. L. SINGLETON

Gulf Oil Corp. is nearing completion of an enlargement program of the cooling-water overflow system at its refinery in Port Arthur. The enlargement of the system has resulted in laying an unusually large combination 84-, 72- and 60-inch electrically welded steel line. The line extends from the disposal pit to a centralized location at the plant where feeder lines from the various refining units will be tied in. When completed the line will have a capacity for handling the overflow from all refining units, and will be large enough to take care of the overflow from any additional units that may be constructed in the near future.

View of ditch showing "sheeting" braced with jacks to keep trench from caving

The system is approximately 1,925 feet in length and is composed of 1,100 feet of 84-inch, 300 feet of 72-inch and 525 feet of 60-inch pipe. The pipe was specially constructed for the job and was made up into 30-foot joints, weighing approximately 11 tons each, and was shipped to the refinery on two barges. It was unloaded at a centralized location along the right of way where it was thoroughly cleaned and given a primer coating of asphalt and then a heavy protective coating of tar enamel. The same application was applied to the inside as well as the outside of each 30-foot section.

As the coating was applied several days before the pipe was placed in the ditch, special precaution was taken in protecting the coating from the sun. This was done by applying a heavy coating of whitewash to the outside and inside of the pipe. The whitewash reflected heat from the pipe and the coating was kept in perfect condition. As each joint was moved to the job, the face of the pipe was wrapped with heavy fireproof roofing paper and then inspected for "pin holes" by a holiday detector.

No unusual problems or methods were involved in laying the line. The only trouble encountered was caused by unfavorable weather conditions and special care had to be taken to keep the ditch from caving. Due to the depth of the ditch, which is 8 feet deep and 12 feet wide, wooden sheeting from 20 to 30 feet in length had to be driven into the ground on each side of the trench along the entire right of way. In some instances it was necessary to brace the sheeting with jacks.

As the final coating was completed, the section was picked up by a large tractor equipped with a crane and moved to the ditch and lowered into position with the assistance of a smaller crane located on the opposite side of the ditch. The joint was welded on the outside and inside to the preceding joint and then tested with 30 pounds pressure. Contract for the line was let to Williams Brothers. Three heavy-duty tractors have been used. One was used for ditching, another for handling the pipe and one for back filling. An average of three joints per day were laid during adverse weather conditions.

Edeleanu Process Described

The treatment of petroleums or petroleum derivatives with liquid sulfur dioxide according to the patents of L. Edeleanu and his collaborators has found wide application in the refining industry during the course of about a quarter of a century. A great deal had to be accomplished, especially from the constructional engineering standpoint, in order to bring this refining process to the point of technical efficiency and economy at which it stands today. The chemico-technological features of the process are described in a volume recently written by Dr. J. C. L. Defize, "On the Edeleanu Process," and published by D. B. Centen's Uitgevers-Maatschappij N. V., Amsterdam, Holland. The volume contains 310 pages and several insert flow charts of typical installations. It is divided into the following chapters: the Edeleanu process, theoretical part and experimental part. In the latter chapter the Edeleanuzation of kerosene, lubricants and light petroleum fractions is described.

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Catalytic Hydrogenation of Octenes to Octanes

Contributed by Combined Staffs of Shell Development Co., and Shell Chemical Co.

The benefits to be derived from the use of high-octane fuels in airplane engines, particularly in those of recent design which operate most efficiently with fuel of a knock rating of 100 on the *iso*octane-heptane scale, are quite pronounced. Whether they find expression mainly in improved fuel economy, in greater load-carrying capacity, greater speed, longer cruising range, or any combination of these and other advantages, the increased value of such fuels, as compared with recent standards, is very much in evidence.[1] Fuel of 100-octane might perhaps be prepared by the addition of large quantities of tetraethyl lead to selected straight-run gasolines; but lead in such proportions would far exceed the present specifications laid down by engine manufacturers, and would lead to objectionable corrosive effects and deposits in the engines. Oxygen-containing compounds can be manufactured which supply an octane-number increase and thereby decrease lead usage; but these compounds are at a disadvantage, compared with hydrocarbons, because of both their lower calorific

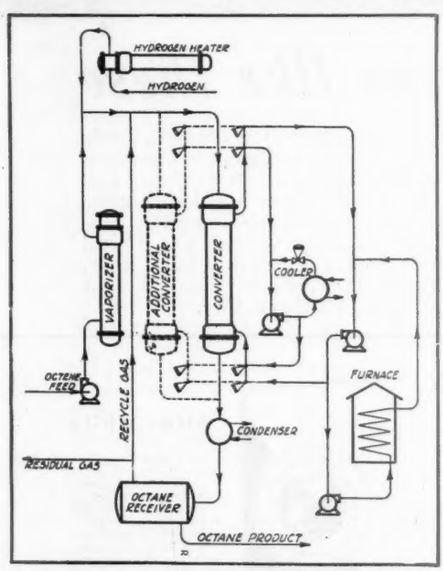

Fig. 1—Single-stage system

value per unit of weight and their greater miscibility with water—the latter causing well-known practical difficulties. A more satisfactory fuel is one containing high-octane hydrocarbons, such as *iso*octane. The search for a satisfactory gasoline of high anti-knock value, containing an optimum amount of lead and having a high calorific value, has been carried on intensively, and has led to the development by the Shell companies of a practical commercial process for the production of octanes of 98-100 octane number, by direct hydrogenation of an octene mixture prepared by butylene polymerization.

A method for the production of the octene mixture has been described by McAllister.[2] The hydrogenation process developed is particularly applicable to the conversion of this octene mixture, although it is suited also to other feeds, such as di*iso*butylene and tri*iso*butylene. The hydrogenation process operates in the vapor phase, and is distinctive in that it employs low pressures (between 1 and 4 atmospheres, gauge) and

A.P.I.—Presented at Mid-Year Meeting, Wichita, Kansas, May 24, 1938

a temperature normally below 200 deg. C. These mild conditions of temperature and pressure are applicable as a result of developing a suitable active nickel catalyst which will hydrogenate octene vapors as they are passed over it with the consumption of only a small stoichiometric excess of hydrogen.

The practicability of the process developed is shown by the fact that since 1935 the Shell companies in the United States have produced more than 10,000,000 gal. of octanes (of 98-100 octane number) using this process.

Application of Process

From thermodynamic data, the conversion of octenes to octanes may be accomplished completely and readily by passing a mixture of octene and hydrogen over a suitable catalyst at atmospheric pressure and temperature. Parks and Todd[3] have discussed the thermodynamics of the reaction producing 2,2,4-trimethyl pentane from di*iso*butylene:

$$C_8H_{16}(\text{liquid}) + H_2 \longrightarrow C_8H_{18}(\text{liquid}),$$

and have chosen the following values for the heat of reaction and the free energy change:

$$\Delta F°_{298} = -20{,}280 \text{ cal. per g.-mol.}$$
$$\Delta H°_{298} = -28{,}470 \text{ cal. per g.-mol.}$$

The relation of temperature to the free energy of this reaction is equated as follows (assuming a linear relationship):

$$\Delta F° = -28{,}470 + 25.7T$$

For the production of gaseous *iso*octane, the relation is:

$$\Delta F° = -28{,}570 + 27.6T,$$

which shows that the vapor reaction is thermodynamically feasible at temperatures below about

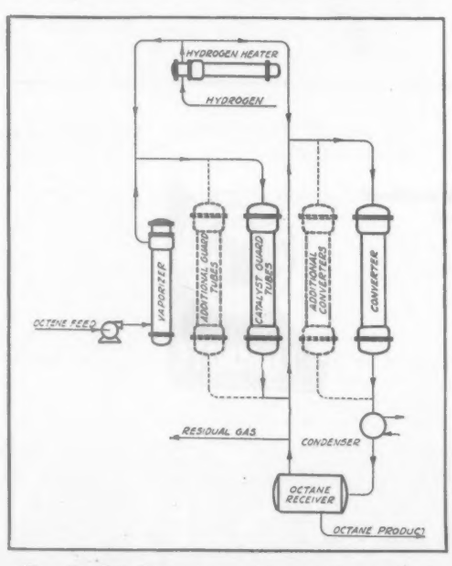

Fig. 2—Single-stage system with catalyst guard tubes

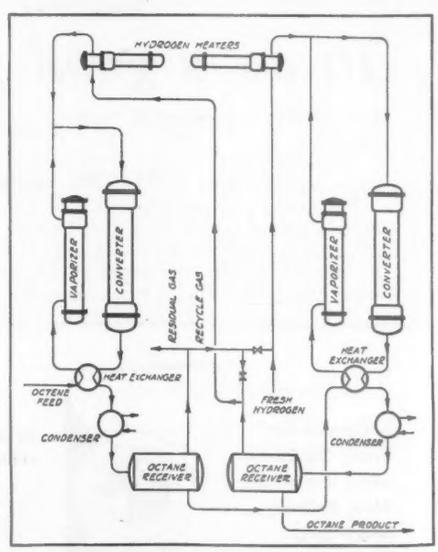

Fig. 3—Two-stage countercurrent system

750 deg. C. At temperatures in the region of 200 deg. C. it is highly exothermic, and the free energy change is decidedly negative. Therefore, in the presence of a suitable catalyst the reaction is highly complete at low pressure, a high partial pressure of hydrogen being unnecessary to effect complete hydrogenation of an octene feed.

While thermodynamic values for the conversion of octenes other than di*iso*butylene would not be equal to those values shown, the order of magnitude would be the same, and the general

conclusions stated will hold for the other octenes as well.

Although the process developed is applicable to the hydrogenation of various olefinic materials, it has been utilized most extensively for the hydrogenation of a mixture of octenes prepared by sulfuric-acid polymerization of butylenes. The octene mixture is the result of interpolymerization of *iso*butylene and normal butylenes, and consists of several isomers, among which are 2,2,4-trimethyl pentenes 1 and 2. (This octene mixture yields a hydrogenated product which needs no additional treatment prior to blending into fuels.) In spite of the co-polymerization of normal butylenes, which enhances the octene yield, the octanes produced therefrom are only 1 to 2 octane numbers lower than pure 2,2,4-trimethyl pentane, and possess blending octane numbers practically equivalent thereto.

Concerning the applications of this process to the hydrogenation of other olefins, the production of *iso*dodecane from tri*iso*butylene has been carried out on a large scale. The equipment and operating conditions are identical with those required for octane manufacture, except that a converter temperature increase to 250 deg. C. and an increased hydrogen-olefin mol ratio in the converters have been found to be most practical.

Temperature and Pressure

The choice of operating pressure and temperature was made after extended investigation; a temperature of 180-190 deg. C. and a gauge pressure of 1 to 4 atmospheres have been found to be most practical. At operating temperatures substantially below 180 deg. C., the rate of reaction is low, and the presence of small amounts of carbon monoxide in the hydrogen feed produces deactivation of the nickel catalyst through the formation of nickel carbonyl. Increasing temperature encourages thermal decomposition of the octene-fraction components, with a resulting decreased yield of octane and increased consumption of hydrogen. The increased consumption of hydrogen results from the hydrogenation of lower-boiling olefins produced in the decomposition, although the decomposition may result in higher-boiling olefins as well. Further, thermal decomposition normally produces some free carbon as well, which deposits on the catalytic surfaces and renders them inactive.

The pressure applied to the system is only that sufficient to maintain good plant control. The use of high pressures is not desirable, particularly with highly-active catalysts, inasmuch as the effect is to compress the reaction into a smaller volume of catalyst, with resultant overheating and consequent deterioration of the active surfaces.

TABLE 1—COMPARISON OF HYDROGEN-UTILIZATION EFFICIENCY SINGLE-STAGE VS. COUNTERCURRENT-FLOW OPERATION

Experiment No. 1—Single-stage, 100-ml. catalyst (no gas re-cycle).
Experiment No. 2—Two-stage, 100-ml. catalyst in each stage (no gas re-cycle).
Olefin feed—di*iso*butylene.
Hydrogen feed—gas containing 75 per cent by volume of hydrogen and 25 per cent by volume nitrogen.

Experiment No.	1	2
Total liquid feed volume, liters	10.7	10.5
Total liquid product volume, liters	10.5	10.3
Unsaturation of product, per cent by weight as C_8H_{16}	1.0	1.0
Product yield, per cent by volume of feed	98	98
Hydrogen feed, liters, as pure hydrogen	2,300	1,600
Mol ratio of hydrogen to di*iso*butylene in converters	1.5	1.06
Utilization of hydrogen, per cent	67	94
Analysis of residual gas after *condensation of octanes*		
C_nH_{2n}	0.0	0.5
H_2	44.3	12.3
C_nH_{2n+2}	7.6(n=3.8)	6.3(n=2.7)
N_2	48.1	80.9
Volume of residual gas, liters	1,600	660

The Catalyst

The catalyst developed consists of activated nickel supported on porcelain. The unformed catalyst is a hydrated nickel nitrate impregnated in porcelain. The nitrate is decomposed to nickel oxide, and then reduced to metallic nickel in a stream of hydrogen. Hydrogen may be conserved by supplying air until decomposition is complete, and introducing hydrogen for reduction only; but the use of hydrogen throughout enhances slightly the activity of the catalyst. After formation, the catalyst is maintained in a hydrogen atmosphere when not in service. Contact with air results in rapid oxidation and consequent loss of activity.

The activated nickel catalyst is susceptible to poisoning, particularly by sulfur. While carbon monoxide and oxygen produce temporary loss of activity, which can be restored by reactivation in place, sulfur produces permanent loss of activity. It is desirable, therefore, to maintain the sulfur content of the octene feed at a minimum. This can be accomplished by proper treatment of butylenes prior to polymerization. The catalyst mass effects substantially complete removal of all sulfur which is contained in the octene feed, producing octanes containing 0.0001 per cent by weight of sulfur; and even after a catalyst loses its ability to promote hydrogenation, it still retains an affinity for sulfur. This retention of ability to remove sulfur is useful, inasmuch as a catalyst no longer able to effect hydrogenation can be used for pre-treating the octene feed in order to reduce its sulfur content before contact with the active catalyst. Proper treatment by butylenes before polymerization reduces the sulfur content of the octene feed to below 0.002 per cent by weight, and a pre-treatment with a spent catalyst reduces this figure on the average to 0.0005 per cent or less. An octene feed treated in this manner then contains only enough sulfur to produce slow de-activation of catalyst. In the plant operation described hereinafter, 1,000 gal. of finished *iso*octane are produced per pound of nickel charged to the catalyst chambers.

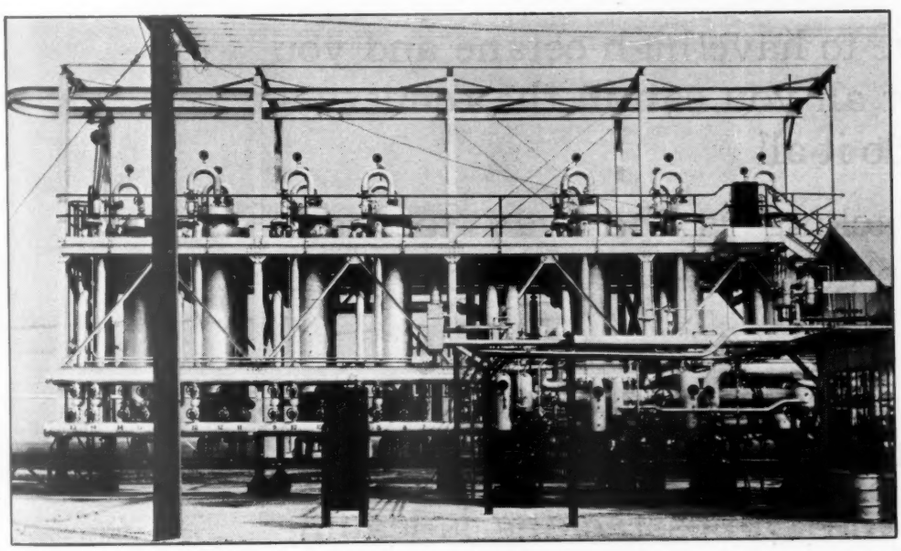

Fig. 4—Catalytic hydrogenation plant in Shell Oil Co.'s Dominguez, Calif., refinery

Hydrogen Supply and Utilization

The source of hydrogen for plant-scale operation is not of particular importance, provided the supply does not contain compounds injurious to the catalyst. Sulfur compounds normally associated with hydrogen gas are easily removed by simple treatment of the gas stream. In the experimental work leading to the development of this process both electrolytic hydrogen and mixtures of hydrogen and nitrogen containing about 75 per cent hydrogen were used. Convenient sources of hydrogen are, for instance, the pyrolysis of natural gas and the dissociation of ammonia. A process for the production of cheap hydrogen, free of impurities which poison nickel catalysts, has been developed recently by the Shell Chemical Company. This gas contains 85 per cent hydrogen, with only methane and nitrogen as impurities. Both methane and nitrogen are inert, and their presence in this amount is not objectionable in the process.

Although excess hydrogen is not imperative in producing a high degree of hydrogenation, when using a single-stage operation a 10 to 15 per cent excess is desirable in order to increase the rate of conversion and decrease the volume of catalyst necessary to produce a unit volume of *iso*octane. Is has been found practical to conserve hydrogen either by means of a two-stage countercurrent flow system or by direct recycling of residue gas through a single-stage converter. When the supply of hydrogen is limited and its cost is an important item in the total cost of operation, a two-stage counterflow system is more economical. In a two-stage system the octene feed to the first converter is mixed with vent hydrogen from a second reactor, the second reactor receiving fresh hydrogen together with partially-converted octenes from the first reactor as feed. Vapor from the second converter is cooled to permit condensation of octanes. With a two-stage countercurrent system a hydrogen utilization of 95 per cent is readily obtained. A simpler arrangement has been developed for use if a hydrogen utilization efficiency of 85-90 per cent is permissible. In this system a 10 to 15 per cent excess of hydrogen is introduced with the octene vapor to a single-stage converter; the excess gas is compressed to remove *iso*octane; and 50-80 per cent of the residual gas is recycled in order to increase the hydrogen-octene mol ratio in the reactors. In one instance of actual plant-scale practice, 80 per cent of the residual gas volume is recycled; and under equilibrium conditions with

72-Octane

That is the average of regular grade gasoline sold in this country today, Oil and Gas Journal finds It sets a new high record

Do you think you can sell ordinary gasoline against such competition — and get the price for it?

You have to have high octane and you have to get all you can in the refinery — lead can't do it all

Dubbscracking is the way to make high-octane gasoline — and get the yield, too

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about 12 per cent theoretical excess of fresh hydrogen added, the recycle gas contains 80 per cent mol hydrogen. The recycle increases the hydrogen-octene mol ratio in the converters from 1.12 to 1.37 in this instance. The recycling operation effects a hydrogen saving of 5-10 per cent in this plant operation.

Single-Stage Vs. Counterflow System

To show the advantage of a two-stage system in conserving hydrogen, data from two comparable laboratory experiments with single- and two-stage operation are shown in Table 1. (While plant-scale operation effects greater hydrogen utilization than in laboratory tests, the comparison of laboratory data is indicative.)

Catalyst Reactivation and Regeneration

The presence of small amounts of sulfur in the octene feed, together with octene decomposition and carbon deposition which accompanies the conversion, would necessitate frequent replacement of the catalyst. However, a method of reactivation has been developed which markedly increases catalyst life. When a catalyst decreases in activity to a certain point, as measured by the throughput capacity of a given volume of catalyst, reactivation in place is practiced. The catalyst bed is purged by hydrogen, and air then is introduced for from 4 to 12 hours, depending upon the condition and the quantity of catalyst. The oxidized catalyst again is reduced with hydrogen. Although the initial activity of the catalyst is not completely restored, applying the reactifying operation two to four times increases the life of a charge of catalyst by at least 150 per cent. The activity declines slowly after each reactivation, however, and ultimately the catalyst charge is removed from the converters, and regenerated.

Equipment for Plant-Scale Operation

The equipment required for plant-scale operation of the hydrogenation process is shown in Figures 1, 2, and 3. These figures are skeleton flow diagrams which show only the major pieces of apparatus.

The principal problem in the design of the catalytic converters is that of heat removal. The heat of reaction, according to Park and Todd,[3] is about 450 B.t.u. per lb. In order to facilitate rapid heat transfer, the catalyst is contained in 3-in. diameter vertical tubes, arranged in bundles by rolling the tubes into end plates, with circulating hot fluid maintained around the tubes. The circulating hot fluid is carried at the desired reactor temperature, and is led from the reactors through a cooler, with a controlled bypass—maintaining thereby a constant temperature on the hot fluid to the converters. For catalyst formation and reactivation, which are carried out at higher temperatures, a separate hot-fluid circulating system supplied with a furnace is used. Where several converters are in use, it is possible thereby to retain some in service while others are being subjected to catalyst formation or treatment.

Heat to the hydrogen heater or octene vaporizer is supplied directly by means of hot fluid. The hydrogen and octene vapors are supplied to the converters at a temperature of not above 200 deg. C.

It is apparent that some heat exchange can be effected within the system, the extent of this exchange being determined by the economics of heat supply. With a single-stage converter the one simple heat exchange is that between the converted gas stream and octenes being fed to the vaporizer. Two heat exchanges are available in a countercurrent system, one on each converter.

Deterioration of equipment due to corrosion is negligible. Due to the low temperatures and pressures employed, no special alloys or materials are necessary in the major pieces of equipment. No parts of the equipment suffer an abnormal rate of wear or deterioration.

TABLE 2—PROPERTIES OF OCTANE

	Octane from Mixed Octene Fraction	Technical *Iso*octane
Gravity, deg. A.P.I.	66.3	70.9
Color, Saybolt	30+	30+
Reid vapor pressure, lb.	2.6	2.1
Unsaturation, per cent by weight	1.1	1.8
Copper-dish gum, mg. per 100 ml.	1	1
Accelerated gum, mg. per 100 ml.	1	1
Wright acid heat, deg. F.	26	23
Navy acid heat, deg. F.	7	3
Sulfur (nephelometric), per cent by weight	0.0001	0.001
Octane No., ASTM	98.2	99.7
ASTM Distillation, Deg. F.		
Initial boiling point	196	205
Dry point	236	235
10 per cent point	221	210
30 per cent point	225	210
50 per cent point	227	212
80 per cent point	230	214
90 per cent point	231	215
95 per cent point	233	216
Distilled, per cent by volume	99	99

Operation of Plant-Scale Process

The operation and control of the hydrogenation system are simple. The primary point of control is the unsaturation of the finished product, as determined by titration with a weak brominating agent.

The use of catalyst guard tubes is advantageous for sulfur removal and, consequently, catalyst conservation; but normally the guard catalysts are not effective in promoting hydrogenation themselves. The total feed hydrogen can be introduced into the octene vapors prior to passing through the guard tubes, but the large amount of hydrogen is not necessary in effecting sulfur removal. Therefore, the major portion of the feed hydrogen may be introduced following the guard tube, thereby increasing the contact time of a unit weight of octenes in the guard tube chamber. As a rough guide, one volume of guard catalyst is sufficient for two volumes of active catalyst.

A feature which has been incorporated in some plants is the inclusion of a catalyst tube for hydrogen feed to convert traces of carbon monoxide to methane and water. This hydrogen guard tube eliminates the possibility of nickel-carbonyl formation on cold spots in the catalyst bed. However, this added precaution is not necessary in most cases. The presence of water vapor is not injurious to the active nickel catalyst. (Normally steam is used for purging the system of either air or hydrogen.)

At the Wilmington, Calif., refinery of the Shell Oil Company a hydrogenation plant has been in operation for 22 months. During this period the yield of finished octanes has averaged 103.1 per cent by volume of the octene feed. (The theoretical yield of 2,2,4-trimethyl pentane is 105.5 per cent by volume of di*iso*butylene charged.) A conversion of 99 per cent is easily attained, although values higher than this necessitate slightly increased apparatus sizes. The Wilmington plant, a single-stage system, has obtained 86-89 per cent utilization of hydrogen while producing 99 per cent saturated product. Other plants using two-stage countercurrent flow have realized 95 per cent hydrogen utilization. Using catalyst guard tubes in series with the converters, the life of a catalyst is 1,000 gal. of finished product per pound of nickel in the catalyst bed. With a catalyst recovery plant the cost of catalyst is not that of replacement but instead, only for reprocessing the spent catalyst. The figure of 1,000 gal. per pound of nickel is attained with an average of three activations with air carried on *in situ*.

Properties of Finished Octane

Some average properties of finished octane prepared by hydrogenation of a mixed octene fraction are shown in Table 2, and for comparison the properties of technical *iso*octane are given also. (Small variations in gravity, distillation, octane number, etc., of octane will result from changes in operation of the plant producing butylene polymers.)

General features of the Shell process as described are covered by patents and patent applications in the United States and abroad.

Conclusion

A catalytic hydrogenation process has been developed by the Shell companies which is simple, economical, and particularly adapted to the hydrogenation of octenes produced by polymerization of butylenes. The process operates at low pressure (below 4 atmospheres, gage) and at a temperature not exceeding 200 deg. C.

The process effects substantially complete hydrogenation, and produces thereby high-octane fuels low in acid-heat number and ideally suited for the manufacture of high-octane aviation gasoline.

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Dew-Point Apparatus Increases Efficiency of Gas Lines

Efficiency of operation of natural gas transmission lines should be increased as the result of the development of a dew-point apparatus suitable for use with natural gases under pressure, by the Bureau of Mines. The temperature to which a gas may be cooled before water will begin to condense may be determined with this apparatus. This information is useful in the prevention of water condensation, which interferes with the flow of gas in the lines and, in combination with constituents of the gas, may form solid gas hydrates.

All natural gas, as it is produced from the well, carries some water in the form of vapor. The dew point, or temperature at which this water vapor will start to condense, frequently is higher than the temperature of the pipe line it enters. When this condition exists, some of the water vapor will condense to liquid as the temperature of the gas drops to the temperature of the pipe line. The apparatus just announced by the Bureau of Mines is useful in determining the dew point of the gas at the well head or along the pipe line, thus making it possible to know whether there is any likelihood that water will condense from the gas.

The gas from a compressor station usually is saturated with water vapor at a temperature considerably above the temperature of the pipe line it enters; consequently unless the gas is dried a considerable amount of water is likely to condense in the line. Many pipeline companies are installing equipment to remove a part of the water vapor in the gas to avoid condensation in their transmission lines. The dew-point apparatus is of value in determining the efficiency and correct adjustment of such equipment.

The apparatus is suitable for working pressures up to 2,500 pounds per square inch, but is equally satisfactory for use at lower pressures. It is simple in design, compact, readily portable, and easily operated. Dew points may be determined with an accuracy of 0.2° F. The dew-point apparatus is described in Report of Investigations 3399, entitled "Bureau of Mines Apparatus for Determining the Dew Point of Gases Under Pressure," by W. M. Deaton and E. M. Frost, Jr., of the bureau's oil and gas laboratory at Amarillo, Tex. This report may be obtained without cost from the Bureau of Mines, Washington, D. C.

Colombian High Court Approves Government Pipe Line Tax

The supreme court of Colombia has decided in favor of the government in its suit to collect an oil pipe line tax of 2½ per cent of the operating revenues from the Andian National Corp., a subsidiary of International Petroleum Co., Ltd.

The Andian National Corp. operates the pipe line through which Colombian crude oil produced by Tropical Oil Co. is transported from the interior to the coast.

Use of Sodium Phenolate for Hydrogen Sulfide Removal

By G. M. CARVLIN
The Koppers Co., Pittsburgh, Pa.

During the last several years there has been a rapidly-growing realization that the recovery of sulfur from cracking-still gases is an objective meriting the serious consideration of all refinery operators. It is the purpose of this paper to present a general review of this subject, with particular reference to the Koppers phenolate process in its theoretical aspects and commercial applications.

Prior to 1936, the primary reason for purifying refinery gas was to prepare it for distribution for domestic and industrial uses where the presence of sulfur would be most undesirable and where

A.P.I.—Presented at Mid-Year Meeting, Wichita, Kansas, May 24, 1938

legal restrictions make the removal of hydrogen sulfide mandatory. The trend toward purification of refinery gas has recently been accelerated by the increasing importance of three other major influences, viz.:

1. Extensive application of processes for the polymerization of hydrocarbons contained in refinery gas, and the advisability of charging gases low in sulfur to these units in order to obviate serious corrosion of equipment and to minimize expense of de-sulfurizing the final liquid product.

2. The development of purification equipment capable of recovering substantially pure hydrogen sulfide which is readily convertible to sulfuric acid by any of the conventional acid manufacturing processes.

3. Maintenance expense for steel parts of furnaces and other refinery equipment due to corrosive attack of the products of combustion of high-sulfur gases when used for fuel. Furthermore, the sulfur dioxide and sulfur trioxide released to the atmosphere in these flue gases constitute a serious pollution nuisance in many cases.

Thus it may be demonstrated that sulfur recovery constitutes one of those gratifying developments which afford an opportunity to recover, as a profitable by-product, a material which has previously been one of the most serious nuisances connected with refinery operation.

Historical

The first liquid de-sulfurization process, called the "Seaboard process," and employing a solution of sodium carbonate, was developed by the Koppers Co. in 1920 for the purification of coal gas. This may rightfully be said to mark the beginning of a new era in the removal of hydrogen sulfide from gas, in as much as it substituted for the cumbersome and labor-consuming iron-oxide boxes a compact and substantially automatic method of removing the hydrogen sulfide by a circulating solution.

Not only was the Seaboard process the pioneer liquid-purification process, but it possesses some virtues of simplicity and economy that make it adaptable to certain conditions today despite the later development of other improved processes that are more generally useful for most conditions. Some 60 Seaboard plants have been built to purify various kinds of manufactured gas. Fifteen have been built to purify natural gas, and installations have been made in seven of the largest refineries of the country. These plants have, without exception, proved to be economical and efficient for the treatment of gases containing hydrogen-sulfide concentrations varying from 50 grains to 6,000 grains per 100 cu. ft. (0.1 to 10 per cent), and in the presence of carbon-dioxide concentrations as high as 15 per cent and oxygen concentrations of several per cent.

The Seaboard process has been applied successfully in commercial practice to the removal of hydrogen sulfide from liquid hydrocarbons of various physical characteristics, the only modification required in the usual gas-purification scheme being substitution of a liquid-liquid contactor for the usual packed or bubble-tray absorber and the addition of a continuous separator.

The two principal faults inherent in the Seaboard process are:

1. Hydrogen sulfide removed from the gas is discharged from the purification plant as hydrogen-sulfide gas mixed with several hundred times its volume of air. Under some conditions this hydrogen-sulfide-containing air may be released directly to the atmosphere, or it may be used as combustion air in boilers, furnaces, etc. Under no practical conditions may sulfur be recovered, so that the Seaboard process is essentially only a gas-purification process with no by-product credit to offset expenses.

2. In the purification of the high-sulfur natural and refinery gases usually encountered, it is necessary to circulate large volumes of solution due to the comparatively low carrying capacity of the weak sodium-carbonate solution employed. In as much as these gases are usually treated at fairly high pressures, the power required for circulating solution results at times in inordinately high operating cost.

In an effort to correct these deficiencies, the Koppers Co. developed several so-called "hot-actification" systems using various solutions for absorbing the hydrogen sulfide, but all having one common feature, viz., that the foul solution from the absorption step is regenerated by boiling, whereby the sulfur is expelled as practically pure hydrogen-sulfide gas saturated with water vapor. The absorbents we have used are all fairly concentrated solutions of alkaline reagents having a high carrying capacity for hydrogen sulfide, such as sodium carbonate, potassium borate, magnesium hydroxide, and sodium phenolate. The latter reagent is the most recently developed, and has had the most extensive practical application.

The general class of purification processes designed to recover hydrogen sulfide in the form of elemental sulfur should receive brief mention here. These processes which have been applied commercially by the Koppers Co. to the purification of manufactured gases have met with considerable success, both in this country and abroad. The three most important processes in this group use alkaline solutions containing iron, nickel, and arsenic salts; and all utilize a similar principle of opera-

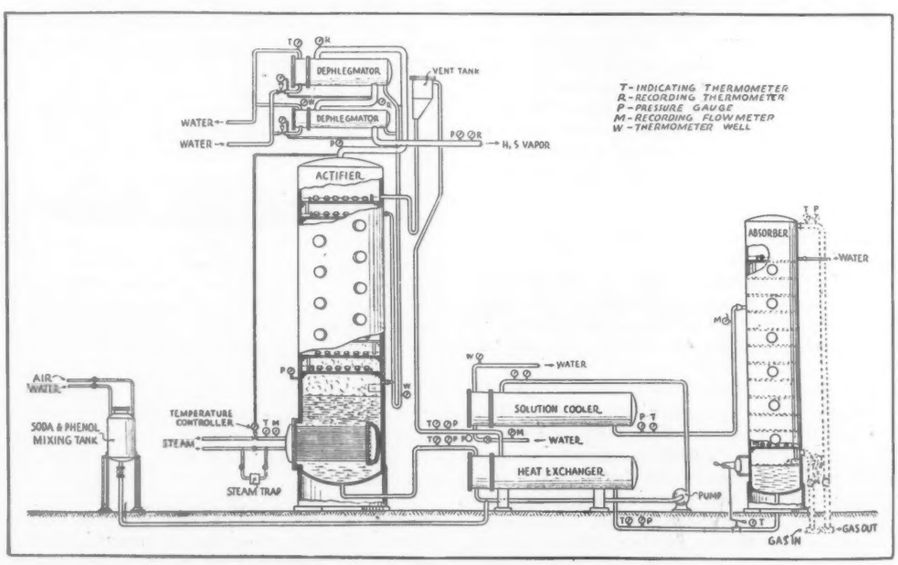

Fig. 1—Flow diagram of single-stage phenolate process

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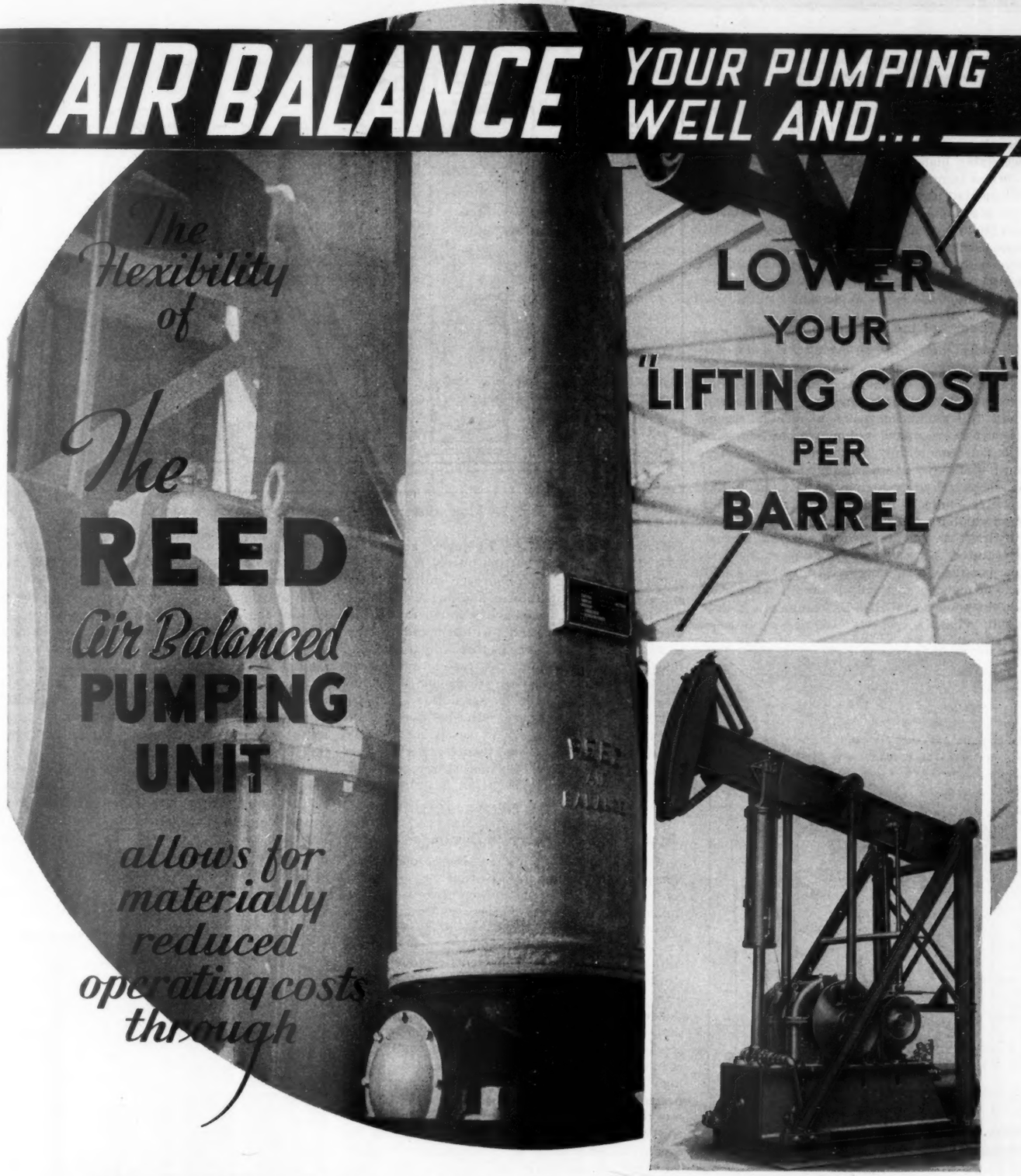
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tion. The foul solution is regenerated by contacting with air, whereupon sulfur is liberated in finely-divided form and separated from the solution as a froth—which is further de-watered and sold in the form of paste containing about 50 per cent water. This sulfur paste has found wide acceptance as a fungicidal spray, and commands a considerably higher price than natural sulfur in its various commercial forms.

Elemental-sulfur recovery processes have not as yet been applied to the treatment of refinery gas—although such application is being seriously considered by some refiners, particularly for the treatment of gas under low pressure or for the conversion of hydrogen sulfide, produced by the hot-actification processes, to elemental sulfur.

Theory of the Phenolate Process

The ideal liquid for absorbing an acidic gas such as hydrogen sulfide is obviously a strongly-alkaline solution; and, consequently, sodium-hydroxide solutions have long been used for the purpose. It is well recognized, however, that regeneration of the resultant sodium-hydrosulfide solution is not economically feasible due to the huge quantities of steam or other energy input required. This energy requirement may be brought within reasonable limits by adding to the caustic solution an auxiliary acidic constituent which has an acidity less than that of hydrogen sulfide at normal temperatures. A great many acids meet the condition, but there is another very important condition to be met that distinctly limits the number of acidic compounds available. Unfortunately, hydrogen sulfide has the property of increasing in acidity with temperature, so that it tends to be held more firmly by the sodium hydroxide at the boiling temperature—and it is a necessary function of the auxiliary acidic constituent to overcome this tendency. This can be accomplished by using an acid which will increase in acidity with temperature rise at about the same rate as the hydrogen sulfide. Under these conditions, the auxiliary acidic constituent will tend to "crowd out" the hydrogen sulfide on actification at the boiling temperature.

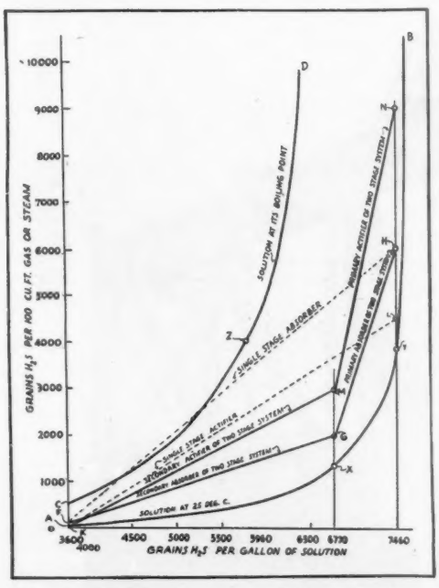


Fig. 3—Chart showing relations between partial pressures of hydrogen sulfide and hydrogen-sulfide content of phenolate solution

The above desirable conditions are admirably met by certain phenols as shown by the fact that the electrolytic dissociation constant of phenol is 1.3×10^{-10}, while that of hydrogen sulfide is 5.7×10^{-8}. This shows that the phenol is a considerably weaker acid than hydrogen sulfide at normal absorption temperatures, and thereby satisfies the first condition named above. Furthermore, the increase in acidity of phenol with temperature rise is almost exactly the same as that of hydrogen sulfide, as shown by the fact that the molecular heat of electrolytic dissociation of phenol is —6,100 calories, while that of hydrogen sulfide is —6,060 calories. Thus it may be seen that the use of sodium-phenolate solution for gas purification is theoretically sound, and that the following reaction is readily reversible within the limits required in practical application:

$$NaOC_6H_5 + H_2S \rightleftharpoons NaHS + C_6H_5OH$$

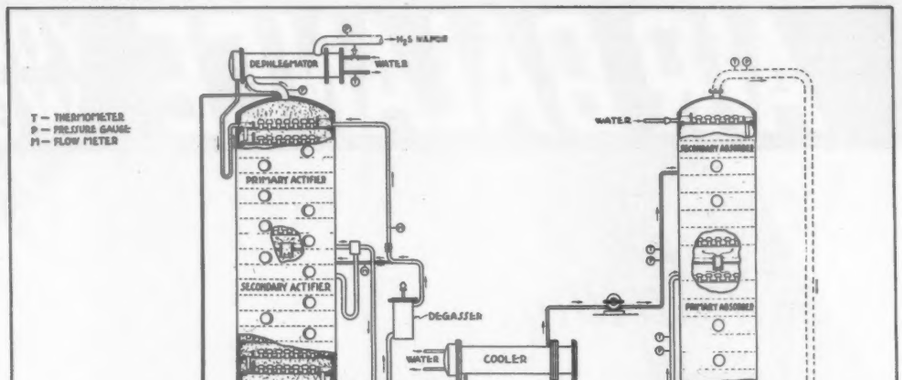


Fig. 2—Flow diagram of two-stage phenolate process

Application of Theory to Design of Plants

The use of a solution, containing in combination an absorption agent and an auxiliary acidic constituent as described above, permits a wide flexibility in the choice of solution for any given set of operating conditions. For example, if the gas contains only a small amount of hydrogen sulfide, and a very high degree of removal is desired, the solution selected will be one containing a fairly low concentration of caustic and proportionately high concentration of phenol in order that the solution entering the absorber will be actified to the low hydrogen-sulfide equilibrium required. On the other hand, if the gas contains a high concentration of hydrogen sulfide and the primary object is to recover sulfur, the solution selected will contain a comparatively high concentration of caustic with a low ratio of phenol to caustic. In general, the phenolate process requires solution circulation rates amounting to only about one-thirtieth of the rates required by the Seaboard process.

The Hoppers two-stage phenolate process has been developed to effect the maximum steam economy in instances where large quantities of sulfur are to be removed, and where the steam or other heat consumption is a vital item in the operating expense. The two-stage process is recommended also in cases where virtually complete removal of hydrogen sulfide is required.

Figure 3 contains a chart showing the relations between partial pressures of hydrogen sulfide and the hydrogen-sulfide content of the solution under the conditions existing in the absorption and actification stages for both the single-stage and the two-stage systems. This chart is based on a set of operating conditions which is fairly typical of refinery-gas purification. The gas to be purified contains 6,000 grains of hydrogen sulfide per 100 cu. ft., and the exit gas contains 80 grains per 100 cu. ft. measured at the actual pressure existing in the absorber. The solution used in this case contains 4 mols of sodium hydroxide and 2.5 mols of phenol per liter. Curve AB in Fig. 3 represents the vapor pressure of dissolved hydrogen sulfide over this solution at 25 deg. C. Curve CD represents the vapor pressure of the solution at its boiling point.

In the specific example which we have taken, the hydrogen-sulfide content of the actified solution in equilibrium with the exit gas is 3,800 grains per gallon, and that of the foul solution in equilibrium with the entering gas is 7,460 grains per gallon. The vapor pressure of hydrogen sulfide in phenolate solutions does not follow Henry's law; and, as a result, the vapor-pressure curves are strongly bowed. Actual operating conditions are

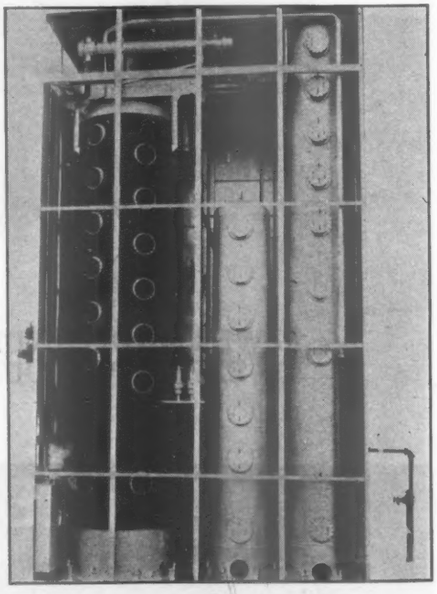


Fig. 4—View of columns in a phenolate-process plant

illustrated by straight lines on the chart. Thus the dotted line FH shows the operation of the single-stage absorber, point F corresponding to the hydrogen-sulfide content of gas leaving the absorber, and of actified solution in equilibrium with it. Point H corresponds to the hydrogen-sulfide content of gas entering the absorber, and of solution in equilibrium with it.

Operation of the primary absorber of the two-stage system is illustrated by the line GH, the point G corresponding to the hydrogen-sulfide content of the solution entering the primary absorber and the hydrogen-sulfide content of the gas leaving the primary absorber. The line FG illustrates the operation of the secondary absorber.

Slopes of the operating lines (FH, FG, and GH) determine the ratio of solution to gas required in the absorber for the single- and two-stage systems. The slope of the line FG, which is comparatively flat, corresponds to the low rate of re-circulation in the secondary system; while the slope of the line GH, which is quite steep, corresponds to a much higher rate of re-circulation in the primary system. The solution circulation rate indicated by the line FH for the single-stage absorber lies between the rates for the primary and secondary absorbers in the two-stage system.

The principal advantage of the two-stage system may be seen from a study of the operating lines for the actifiers. The line KL represents the operation of the single-stage actifier, showing actification of the solution from a concentration of 7,460 grains of hydrogen sulfide per gallon to 3,800 grains per gallon. The slope of this operating line is comparatively flat, and the distance between KL and the curve CD increases rapidly as the concentration of hydrogen sulfide in the solution increases. This characteristic limits the steam economy of the single-stage system, and it may readily be seen that the addition of a second actification stage causes the operating curve of the actifier to approach more closely the vapor-pressure curve of the boiling solution. If several stages of actification were used, a corresponding number of operating lines joining at various angles would result—and a still closer approach to the curve representing the vapor pressure of the solution would be effected.

In as much as the slope of the line MN is much steeper than that of the line KM, it follows that the steam required for actification per gallon of solution in the primary actification stage is very much less than the steam required per gallon in the lower- or secondary-stage actifier section. Consequently, the rate of solution circulation of the primary system is relatively high, and the steam required for actification per gallon of solution is relatively low as compared to the secondary system. In as much as the steam employed in the secondary actifier is later used in the primary actifier, and in as much as the two systems are in balance as regards steam requirement, the net result is to lower the total steam consumption for the plant very materially. Table 1 shows a comparison of actual steam requirements per 1,000 cu. ft. of gas purified for the single- and two-stage systems according to the given set of conditions.

Operation of the single- and two-stage phenolate systems is illustrated by flow diagrams in Fig. 1 and 2, respectively. The single-stage system comprises a continuous cyclic operation, similar to the familiar system used for absorption and recovery of gasoline from natural gas. Gas enters the bubble-tray absorber at the base, and leaves at the top after passing through a series of bubble-cap trays countercurrent to the flow of actified phenolate solution which enters the column on the fourth tray from the top. A very small volume of fresh water is introduced continuously on the top tray to scrub out and return to the solution any chemicals entrained in the gas. The foul solution

TABLE 1—COMPARISON OF STEAM REQUIREMENTS

	Single-stage system	Two-stage system		
		Primary stage	Secondary stage	Total of both stages
Grains hydrogen sulfide per 100 cu. ft. in inlet gas	6,000	6,000	2,000	6,000
Grains hydrogen sulfide per 100 cu. ft. in outlet gas	80	2,000	80	80
Grains hydrogen sulfide removed	5,920	4,000	1,920	5,920
Grains hydrogen sulfide per gallon of fresh solution	3,800	6,770	3,800	....
Grains hydrogen sulfide per gallon of foul solution	7,460	7,460	6,770	....
Grains hydrogen sulfide per gallon of solution	3,660	690	2,970	....
Grains hydrogen sulfide per 100 cu. ft. of steam entering actifier	0	3,000	0	0
Grains hydrogen sulfide per 100 cu. ft. of steam leaving actifier	4,500	9,000	3,000	9,000
Grains hydrogen sulfide per cubic foot of steam	45	60	30	90
Pounds of steam required per 1,000 cu. ft. of gas	52.6	26.7	25.6	26.7

is forced by the gas pressure from the reservoir in the base of the absorber through the heat exchanger to the top of the actifier column. The solution flows down the actifier countercurrent to a stream of steam which is released from the solution itself by the reboiler in the base of the column. The actified solution flows by gravity through the heat exchanger to the suction of the circulating pump, which forces it through a tubular cooler, and thence to the inlet of the absorber—where the cycle again begins.

Hydrogen sulfide released in the actifier passes through the dephlegmator, where the accompanying water vapor is condensed and returned to the actifier column. The hydrogen sulfide, having a purity of 95 to 99 per cent (exclusive of water vapor) then passes on to the acid-plant burner or other point of disposal. . . .

The functioning of the plant is almost entirely automatic. Steam to the reboiler is controlled automatically by the temperature of the vapors leaving the actifier. Water to the dephlegmator is controlled by the temperature of the vapor leaving the dephlegmator. It is necessary to add phenol only at intervals of several weeks.

The operation of the two-stage system differs from the single-stage operation, as outlined above, in the following particulars:

The major portion of the solution is withdrawn from the actifier about midway of the column, and is introduced into the absorber about half way down the column after passing through the heat exchanger and cooler. The minor part of the solution continues down to the base of the actifier, and in the course of this travel is contacted with a proportionately large amount of fairly clean steam. This small volume of highly-actified solution is pumped through a cooler to the upper section of the absorber. After flowing through the secondary absorber, this solution joins the main body of solution in the primary absorber, and the entire volume of solution is forced by the gas pressure through the heat exchanger to the top of the actifier column.

Phenolate Plants Operating on Refinery Gas

Fig. 4 shows a photographic view of the columns in a phenolate plant built by the Koppers Co. for a large refinery on the Pacific Coast. This plant has a capacity of 16,500,000 cu. ft. of gas per day

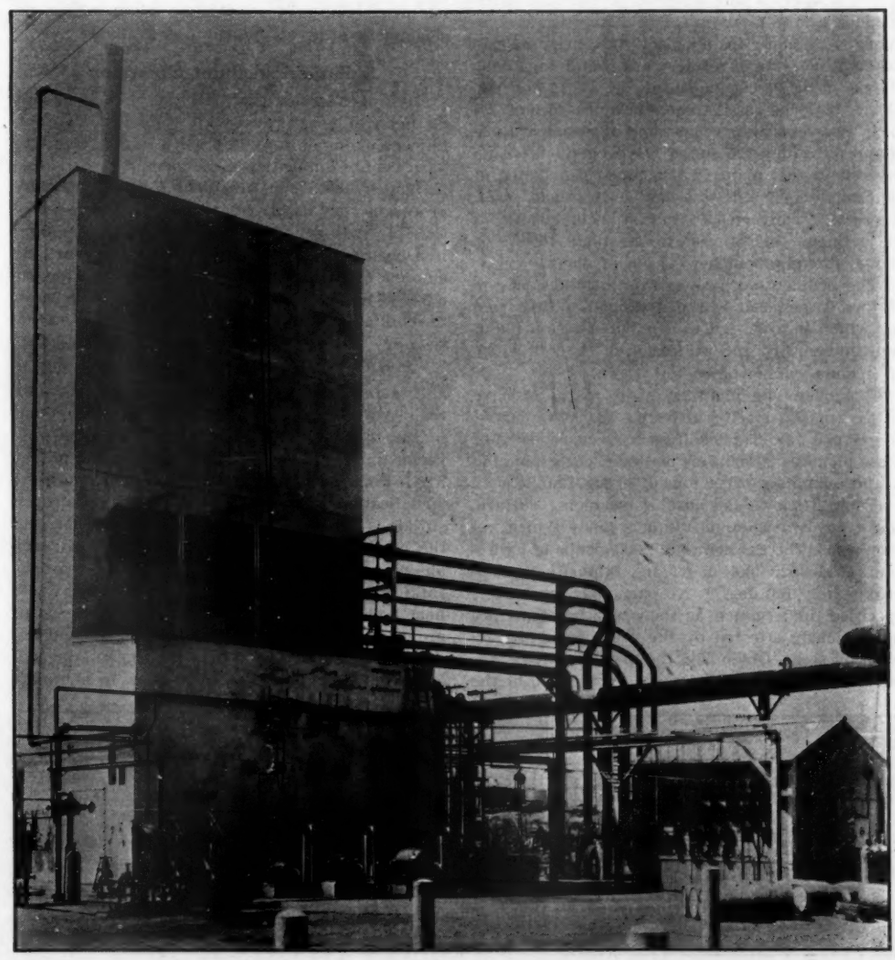


Fig. 5—Phenolate-process plant with columns enclosed in steel shell

containing 4 to 5 per cent of hydrogen sulfide (2,500 to 3,200 grains per 100 cu. ft.). The recovery of sulfur at capacity operation amounts to 35 tons per day. The recovered hydrogen sulfide is forced by actifier pressure through a pipe line over a mile long to a contact-type sulfuric-acid plant, where it is converted to sulfuric acid. The dark insulated column in the photograph is the actifier. The other two columns are absorbers handling separate streams of gas at pressures of 5 lb. and 150 lb. The gas temperature is approximately 100 deg. F. The lower section of the taller absorber comprises the degasser, where absorbed hydrocarbon gases are released from the foul solution before it proceeds to the actifier.

Fig. 5 is another view of this plant showing a novel feature in its design, viz., the gas-tight steel enclosure around the towers and tubular equipment. This housing was specified by the purchaser as a safety feature to eliminate possible hazards from the toxic hydrogen sulfide, in the event of rupture of the vessels or piping. All control valves are located adjacent to a platform along the outside of the enclosure. The back of the instrument panel may be seen forming one side of the control house at the right of the photograph.

The primary purpose of this installation is to recover sulfur for the manufacture of sulfuric acid. Another advantage gained by purifying these fuel gases is the elimination of corrosion around the furnaces and correction of atmospheric pollution by the sulfurous flue gases. This plant has been in operation for almost two years, and has consistently recovered 96 to 98 per cent of the hydrogen sulfide from the gas at a low cost per ton of sulfur equivalent.

Fig. 6 shows a photograph of a phenolate plant installed by the Koppers Co. in a large eastern refinery. This plant has a capacity to purify 23,000,000 cu. ft. per day of refinery gas containing about 1½ per cent hydrogen sulfide (1,000 grains per 100 cu. ft.). The gas is treated at a pressure of 225 lb. in two separate streams, and at a temperature of approximately 125 deg. F. Hydrogen sulfide recovered in this plant is also piped a distance of approximately 1 mile to a contact-type acid plant, where it is converted to sulfuric acid for use in the refinery. In contrast to the plant described above, all equipment here is out of doors.

The primary purpose of this installation is to remove 95 per cent of the hydrogen sulfide from gas which is to be fed to a polymerization plant, and the recovery and utilization of the sulfur are of secondary importance.

Phenolate-type plants now in operation have an aggregate capacity to purify 55,000,000 cu. ft. of gas per day. Total sulfur-recovery capacity of these plants is 26,000 tons per year, corresponding to approximately 75,000 tons of 66-deg.-Baume acid.

Table 2 shows the cost of producing sulfuric acid from hydrogen sulfide in a fairly typical refinery gas. The gas contains 1,000 grains of hydrogen sulfide per 100 cu. ft., and is purified at approximately 100 deg. F. No particular pressure is specified, in as much as the operating costs are not seriously affected by the pressure in the absorption stage. Obviously, the pressure of the gas does have a material influence on the size of the equipment and, consequently, on the cost of the plant.

TABLE 2

Daily Material Balance

Gas treated, cu. ft.	20,000,000
Pressure, lb. per sq. in.	100
Temperature, deg. C.	25
Hydrogen-sulfide concentration, grains per 100 cu. ft.	1,000
Hydrogen sulfide recovered (95-per-cent removal), tons	13.6
Sulfur equivalent, tons	12.8
100-per-cent sulfuric acid produced (95-per-cent conversion), tons	37.2
Sulfuric acid (66 deg. Baume) produced, tons	34.6
Value of acid (66 deg. Baume) at $13.50 per ton	$467.10

Aggregate Daily Operating Cost for Purification and Acid Plant

Labor: one man, 24 hours at $.80	$19.20
Laboratory and supervision	5.00
Steam: 180,000 lb. at $.20	36.00
Power: 2,400 kwh. at $.005	12.00
Water: 790,000 gal. at $.015	11.90
Phenol: 90 lb. crude tar acid at $.10	9.00
Supplies	3.50
Maintenance	15.00
	$111.60
Operating cost per ton of acid (66 deg. Baume)	$3.25
Net return before fixed charges	$355.50
Annual return before fixed charges (350-day year)	$126,000
Annual return on investment (approximate), per cent	50

It is apparent that the largest single item of operating cost is that for steam to actify the solution. A large part of the required steam may be recovered in the acid plant from heat of combustion of the hydrogen sulfide when the volume of hydrogen sulfide burned is sufficient to justify the expenditure for a waste heat boiler. (Hydrogen sulfide has a calorific value of 655 B.t.u. per cubic foot.) In cases where fuel gas is relatively cheap as compared to steam, a gas-fired reboiler may be used in the actification stage. This has been done on one natural-gas purification plant where no steam-generating equipment was available.

Sulfuric-Acid Plant Operation

Hydrogen-sulfide gas from the phenolate-plant actifier will be saturated with water vapor at cooling-water temperature, and will contain from 1 to 4 per cent of impurities in the form of carbon dioxide and hydrocarbons. Incidentally, the phenolate process is very highly selective toward the absorption of hydrogen sulfide from gases containing hydrogen sulfide and carbon dioxide, so that the amount of carbon dioxide contaminating the recovered hydrogen sulfide is slight in comparison to contamination encountered in other sulfur-recovery processes.

Water vapor present in the hydrogen sulfide and water formed in its combustion necessitate the use of a so-called "purification-type" acid plant, inasmuch as the sulfur dioxide entering the converter must be bone dry for American acid plants. Fig. 7 illustrates the flow of materials through the "purification-type" contact acid plant. Hydrogen sulfide is burned in a refractory-lined burner, and the combustion products (mixed with secondary air in an amount necessary to provide the proper ratio of sulfur to oxygen) pass through a waste heat boiler to a cooling tower—where the gases are cooled by water or weak acid in a closed circulation system. The cooled gases pass through a Cottrell precipitator or coke filter, to eliminate entrained mist, into a drying tower—where they are scrubbed with 98-per-cent sulfuric acid. The bone-dry gases are then forced by a blower through a heat exchanger and into the converter. Here the hot gas passes through the vanadium or platinum mass, and the sulfur dioxide is converted to sulfur trioxide. After the converter, the gases exchange heat with the cold incoming gases, and enter the final absorbing tower—where the sulfur trioxide is absorbed in 98 per cent acid. The final product is removed from this circulation system, and it may be converted to weaker acid or to oleum

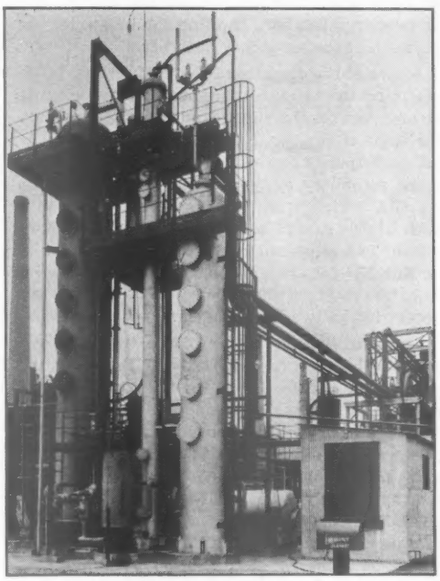


Fig. 6—Phenolate-process plant showing absorbers, actifier, and de-gasser

by brief additional processing. The inert gases, consisting of nitrogen, carbon dioxide, oxygen, and traces of sulfur dioxide, are released to the air through a stack on top of the absorber. Normal conversion efficiency from hydrogen sulfide to sulfuric acid is about 95 per cent of stoichiometric equivalent.

Hydrogen sulfide may be converted to sulfuric acid in existing chamber-type plants, but no description of application to the chamber process will be attempted here, inasmuch as it is unlikely that any new chamber installations will be made for this purpose.

Summary

The Koppers phenolate process uses a solution of sodium phenolate to absorb hydrogen sulfide from refinery and natural gases. The solution is continuously regenerated by means of steam vapor, and the hydrogen sulfide is recovered in practically pure form suitable for conversion to sulfuric acid in a conventional-type acid plant. Acid (of 66-deg.-Baume concentration) may be produced from a typical refinery gas at a total operating cost of $3.25 per ton, with no credit allowed for purified gas or for reduction of maintenance or for elimination of atmospheric pollution. The investment for purification plant and acid plant may be amortized in two years in the typical case cited.

Phenolate-type plants have been in commercial operation approximately two years, total installed capacity being 55,000,000 cu. ft. of gas per day. Sulfur-production capacity of these plants is 26,000 tons per year, equivalent to 75,000 tons of 66-deg.-Baume acid. The process is adaptable to a wide range of operating conditions due to flexibility in selection of concentrations of the two chemical constituents, and in design of equipment.

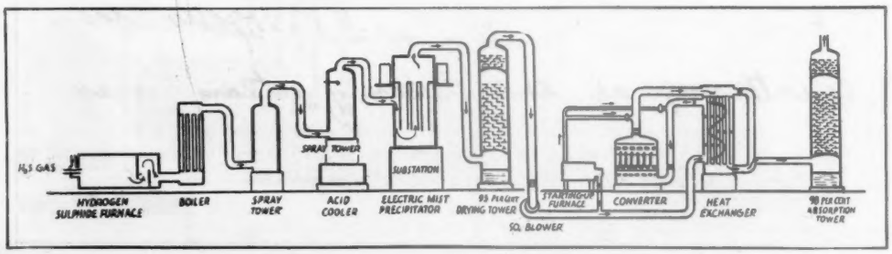
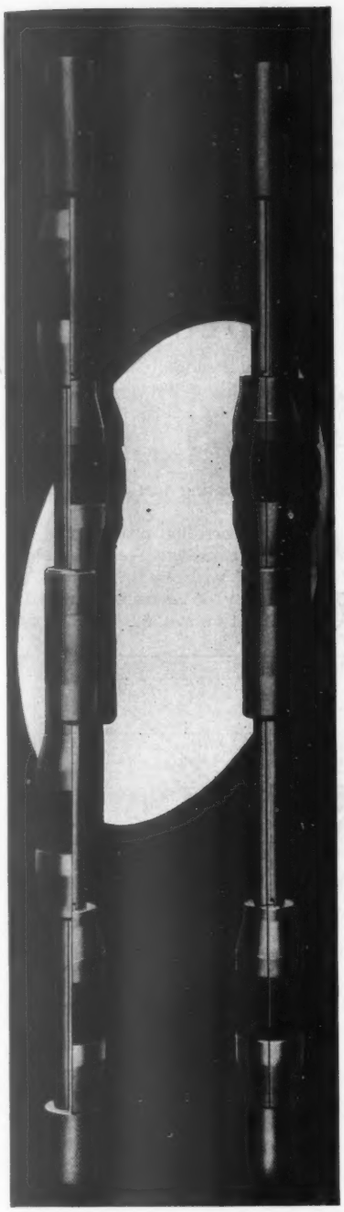


Fig. 7—Flow diagram of "purification-type" contact acid plant



DOWN STROKE
Note that movable half of each rubber has risen above stationary half . . allowing an area for fluid passage much larger than that of conventional type swabs.

UP STROKE
Note that movable half of each rubber has dropped back beside its other half. Rubbers now in swabbing position.

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LABORATORY CONTROL OF CORROSION OF DISTILLATION EQUIPMENT AND OF DESALTING PROCESSES

By L. L. DAVIS, J. M. JONES and C. A. NEILSON
Continental Oil Co.

A survey of recent refinery trade literature shows a very active interest in the subjects of desalting crude and the protection of distilling equipment from corrosion. In general, the literature is restricted to descriptions of methods and processes which are limited to certain specific conditions. Inasmuch as it is impossible to translate data from these limited methods and processes for general application, decided differences of opinion have arisen as to the optimum conditions for protection against corrosion. Moreover, the problem is further complicated by the lack of uniformity in the various test methods and control methods employed by the different investigators. During the past 12 years, since Walter Miller[1] discussed our procedure in combating corrosion resulting from Amarillo crude, we have developed uniform methods of studying and combating corrosion at our various refineries. It has been suggested that we present a discussion of these methods as a start toward the accumulation and possible unification of proceedings for the prevention of corrosion of distilling equipment.

Salt in crude oil continues to be one of the most serious problems of the oil refiner. These salts, usually the chlorides of sodium, calcium, and magnesium, cause two different types of trouble: 1, the mechanical clogging of furnaces, tubes, condensers, lines, etc., by deposition; and, 2, corrosion of refinery equipment by hydrolysis

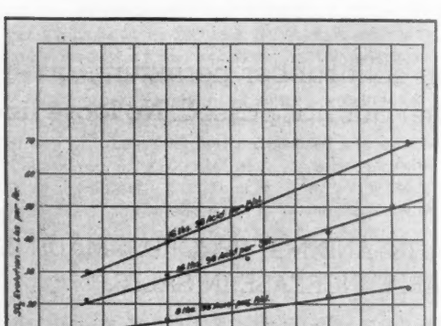

Fig. 1

of some of these salts to chemically-active hydrogen chloride. The clogging of lines may be reduced or entirely eliminated by desalting the crude oil, which in turn reduces the degree of corrosion; therefore, desalting and corrosion protection of distillation equipment are so inter-related that both factors must be considered together.

The causes of corrosion of distillation equipment and the factors to be considered in the development of means of combating such corrosion may be outlined as follows:

A. Most frequent causes of corrosion:
1. Hydrogen chloride which results from the hydrolysis of magnesium chloride and hydrogen chloride in crude oil from the hydrochloric-acid treatment of wells.
2. Hydrogen sulfide from the crude oil and from the decomposition of organic sulfur compounds.
3. Sulfur dioxide from the decomposition of the products of sulfuric-acid treatment of distillates.
4. Dissolved oxygen, usually from distillation steam.
5. Organic acids, mercaptans, etc. The amount of corrosion from this source is usually negligible.
6. Water corrosion of cooling and condensing coils.

***A.P.I.*—Presented at Mid-Year Meeting, Wichita, Kansas, May 24, 1938**

B. The study of any given distillation system to develop corrosion protective measures should include:
1. Determination of which of the above six causes of corrosion must be counteracted.
2. Determination of amount of corrosive agents either formed or released in the system:
   a. By analysis of the charge.
   b. By analysis of the effluent streams.
3. Determination of the extent of metal corrosion.
   a. By analysis of effluent streams.
   b. By record of metal loss from specific plant equipment over a period of time.
4. The selection and control of methods of combating corrosion.
   a. Removal of source of corrosion from oil before charging.
   b. Protective chemical control:
      (1) By stoichiometric calculation of amount required to neutralize corrosives.
      (2) By analysis of effluent stream to determine the nature and amount of corrosive action.
      (3) By the reactivity of the condensate—such as pH value of water.
   c. Use of special alloys in equipment fabrication.
   d. Flooding with water.

The successful protection of a given distillation unit from corrosion may include any one or all of the corrosion-combating methods outlined above.

In the study of any corrosion problem the direct relationships are immediately apparent between the three general variables which are: *a*, source, kind, and quality of corrosive material; *b*, the protective method or methods which may

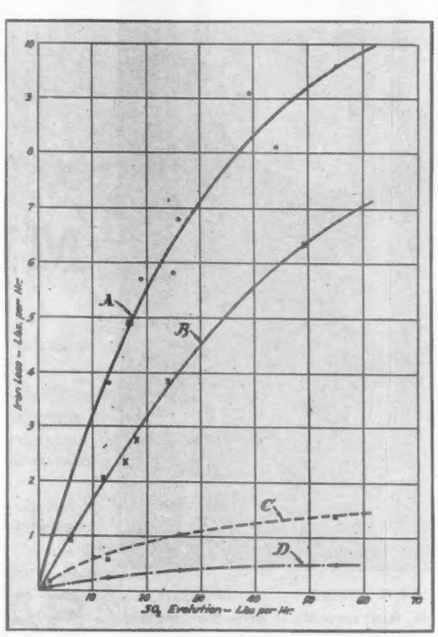

Fig. 2

be employed; and *c*, the nature of the metals or alloys employed in fabricating the equipment. Obviously, the over-all system is so complex, and the factors are so inter-related, that a discussion of any individual factor would be of little value. Corrosion-prevention studies necessitate the methodical and simultaneous study of all of these inter-related factors.

To give a general idea of the procedure we employ in making a study of a corrosion problem, two typical distillation operations and the corrosion-prevention methods adopted are described. The details of laboratory test procedures are included as an appendix.

The first example of a typical distillation operation involves the relatively simple system of distillation of an acid-treated cracked distillate. In this system sulfur dioxide is the only corrosive agent present, and iron (steel and cast iron) is the only metal exposed to the sulfur dioxide. The second example pertains to a more complex crude distillation system in which two corrosive agents, and at least four different metals or alloys, are exposed to the corrosive materials. The

corrosive agents are hydrogen sulfide and hydrogen chloride; and the metals present are steel, admiralty metal, red brass, and nickel-aluminum bronze.

Running Acid-treated Cracked Distillate

The first example is of a former operation at our Baltimore, Md., refinery wherein a cracked distillate from Pecos crude was treated with sulfuric acid in batch agitators to reduce the sulfur content of the gasoline, with subsequent distillation of the acid-treated distillate. Six to eight pounds of 98 per cent sulfuric acid per barrel were required for a final product with a sulfur content of 0.15 per cent, and 14 to 16 pounds for a finished product of less than 0.1 per cent sulfur.

The rerun still consisted of a pipe-still and bubble-tower system in which the gasoline was flashed-distilled in the tower and the tower bottoms circulated through the furnace for heat. A maximum liquid temperature of 415 deg. F. was

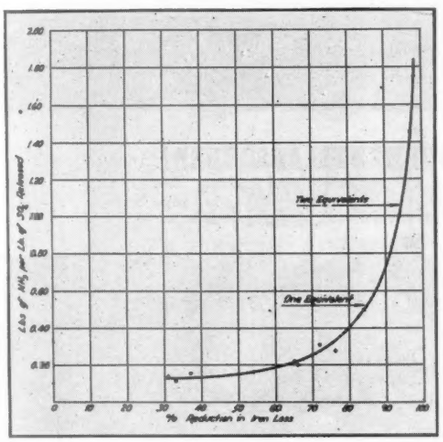

Fig. 3

maintained in the pipe still, and 30 pounds of steam per barrel was injected into the base of the tower for stripping. The vapor and condenser system was of steel and cast iron.

The amount of sulfur dioxide released for different quantities of acid and for different rates of charge was determined by analyzing the effluent streams (gasoline, water, and gas) for sulfur dioxide. The results are plotted in Fig. 1. The individual points are actual determinations from the commercial equipment. A laboratory method (method No. 3 in appendix) was developed which gave the sulfur-dioxide release from a given acid-treated distillate within 2 per cent of the actual value obtained on the commercial unit.

Inasmuch as the products of corrosion by sulfur dioxide are water-soluble, the rate of corrosion for a given rate of sulfur-dioxide evolution could be ascertained by determining the iron (method No. 4) content of the condensate water. The actual iron loss in pounds per hour for several rates of sulfur-dioxide evolution is given by curve A, Fig. 2. From Fig. 1, the sulfur-dioxide release for a charging rate of 150 bbl. an hour with a 16-pound acid treatment was shown to be 60 pounds an hour—which would give, from Fig. 2, an iron loss of 10 pounds an hour, or 240 pounds a day.

From inspection records it was found that the cast-iron condenser sections usually failed, and had to be replaced after having lost about one-third of their total weight. The effective loss of iron was, therefore, three times that shown in Fig. 2. As the average cost of a pound of a cast-iron condenser section was $0.08, the actual value of a pound of iron loss through corrosion was $0.24. Therefore, the value of metal loss through corrosion in the example given above was $57.60 a day.

The first attempt at chemical protection was the circulation of large volumes of caustic-soda solution through the condenser system. This protected the lower half of the condensers, but did not protect the upper portion. The iron loss each hour with caustic-soda circulation is given by curve B, Fig. 2.

As a second attempt, gaseous ammonia was injected into the distillation system to neutralize the sulfur dioxide, and the resultant iron loss when using one equivalent $[(NH_4)_2SO_3]$ of ammonia is given by curve C, and for two equivalents by curve D. The relationship between the ratio of ammonia to sulfur dioxide and the decrease in iron loss is given in Fig. 3. It will be seen that twice the theoretical amount of ammonia was required to reduce the iron loss by 95 per cent.

The routine control procedure was to analyze by method No. 3 each tank of treated distillate for sulfur-dioxide release before charging to the rerun unit, and the necessary amount of ammonia to obtain the desired protection was calculated. When this distillate was then charged to the still, the ammonia-injection rate was set at the predetermined value. Hourly samples of condensate water were checked by the stillman for iron content, using method No. 4, and the ammonia readjusted as necessary. The standard comparison colors for iron content were calculated as "pounds of iron loss per day." This figure, being recorded by the stillman hourly, had a very salutary effect on the operators in maintaining a low iron loss.

The final control of corrosion in this system was the equivalent of "removal of source of corrosion before charging." This was accomplished by installing a Stratford continuous treating process[2] which gave a treated product containing a minimum of sulfuric-acid reaction products—which, obviously, decreased to a minimum the sulfur-dioxide evolution on re-distillation. The results were:

	98 Per Cent Acid Used	
	15 Lb. Per Barrel	8 Lb. Per Barrel
Sulfur-dioxide evolution, lb. per 1,000 bbl.	38.0	20.0
Iron loss, no ammonia, lb. per 1,000 bbl.	2.0	1.1
Ammonia used, lb. per 1,000 bbl.	20.0	15.0
Iron loss, with ammonia	0.1	0

Corrosion of Crude Distillation Equipment

The serious corrosion of crude distillation equipment usually occurs from the combined attack of hydrogen chloride and hydrogen sulfide.

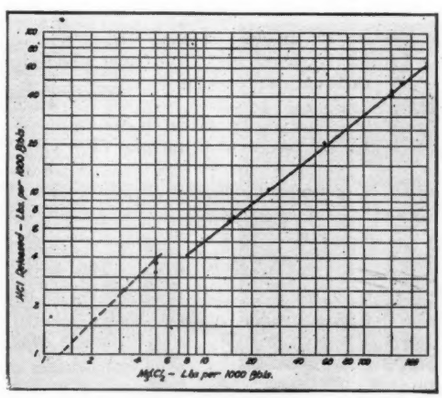

Fig. 4

Other corrosives, such as mercaptans, organic acids, etc., are usually minor in importance, and may be disregarded if the system is properly protected against the attacks of hydrogen chloride and hydrogen sulfide.

Hydrogen sulfide which occurs naturally remains in solution in the crude, and is released on heating. Probably most of the hydrogen sulfide encountered in crude distillation is produced during distillation by the thermal decomposition of sulfur-containing compounds, particularly those of the aliphatic series such as the mercaptans.

Hydrogen chloride may occur as such in the crude oil through acidization of oil wells, but it is generally agreed that the major source is from the hydrolysis of alkaline earth salts during distillation.

Inasmuch as hydrogen chloride and hydrogen sulfide are almost always found together in crude oil, the resultant corrosion of crude distillation equipment is through their combined effect rather than through each individually. It is certain that traces of hydrogen chloride greatly accelerate the rate of corrosion from hydrogen sulfide. This is due to a cyclic reaction within the vapor and condenser system, wherein hydrogen chloride attacks the iron to produce ferrous chloride. The iron of the ferrous chloride is then precipitated

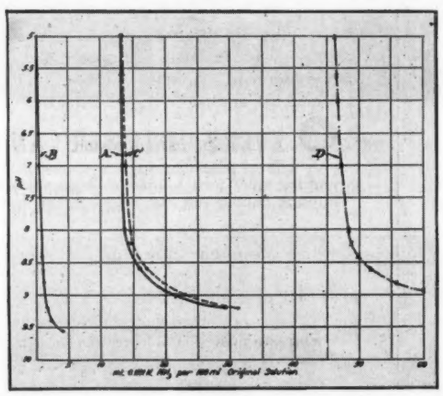

Fig. 5

as the sulfide by hydrogen sulfide, thus freeing the hydrogen chloride for additional attack on the iron. It is reasonably certain that this cyclic reaction is accelerated by the presence of free oxygen. Accepting this cyclic activity of hydrogen chloride, it is evident that the major problem in preventing corrosion of distillation equipment is the neutralization of the hydrogen chloride.

The substantial reduction or prevention of hydrogen-chloride corrosion may be accomplished in a number of ways, such as by removing the salts from the crude before distillation, by neutralizing the hydrogen chloride after release by alkaline chemicals, by the use of special alloys in equipment fabrication, or by combinations of two or more of these methods.

Desalting Crude Oil

Methods are now available[3, 4, 5, 6] for successfully removing all but a trace of the salts originally occurring in a crude. Thus at Continental's Artesia, N. M., refinery, the Petreco process is reducing the salt content of the crude charged from about 100 pounds down to 7.7 pounds per 1,000 bbl.

Desalting equipment and processes have been extensively discussed in the literature; but the literature on the control of desalting operations is not extensive, and is far from uniform.

The control of a desalting operation is usually quite critical. An exact balance of temperature, wash-water quantity, pressure, degree of emulsification and separation (settling time, electrostatic field, filtration, or centrifuging) must be maintained at all times for uniform results. In view of these variables, the correct conditions for optimum separation of salt from any given crude by any specific process must be determined.

(Continued on Page 68)

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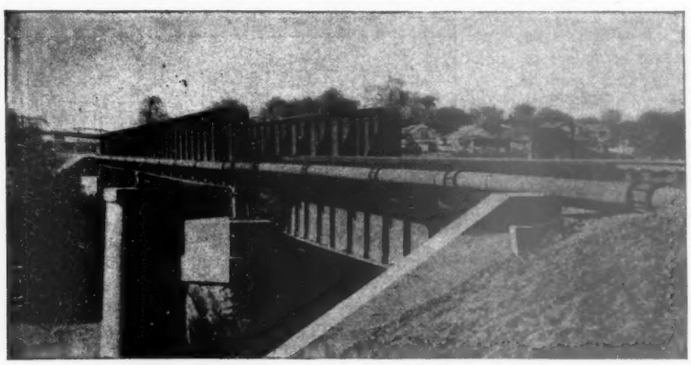

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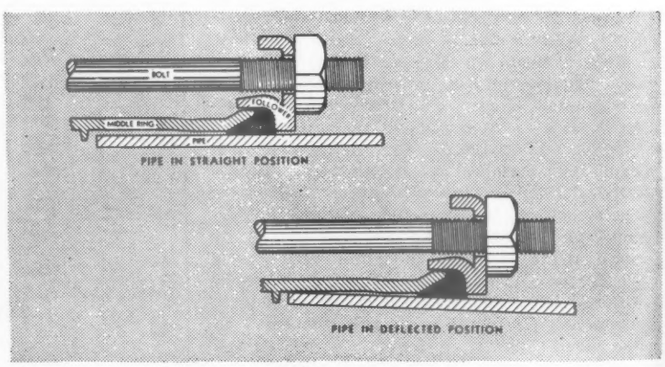

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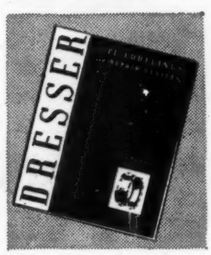

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PIPE COUPLINGS

A rapid and accurate method for determining the salt content of the crude before and after desalting is required for process control. The Continental phenolic water-wash method (method No. 1 in appendix) is recommended for routine control work.

The usual procedure in controlling desalting-plant operations is to determine the salt content of the crude oil before charging it to the process. When stratification in the crude-oil tank is expected, several samples taken from different tank levels should be tested. With these test data available, it is possible to pre-set the conditions at the desalting plant for the maximum removal of salt.

The effluent crude from the desalter should be examined as frequently as experience dictates, to determine efficiency and to control satisfactorily the desalter operation. This examination may involve either a test for salt content or a test for hydrogen-chloride release by the distillation method. If experience shows that there is a wide variation in ammonia requirements at the crude distillation stills, probably the latter test is preferable.

Prevention of Corrosion by Use of Alloys

The use of special alloys to overcome corrosion has developed rapidly during the past few years, and extensive discussions on the subject are available in the literature. As a rule, the use of special alloys for corrosion prevention is limited to locations where the corrosion is so severe that the usual chemical protective measures fail.

Special alloys are frequently used to combat a corrosive-water condition. In doing this care

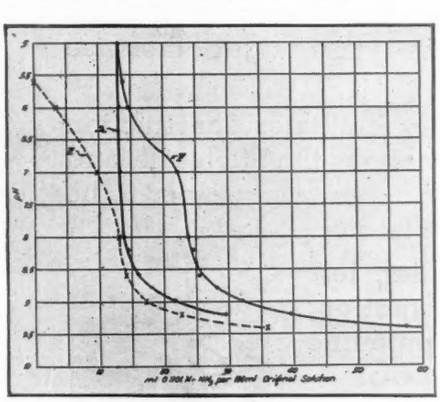

Fig. 6

must be exercised in selecting a protective chemical for corrosion protection on the oil-vapor side of these tubes, because the alloy for corrosion protection on the water side of the exchanger may be rapidly attacked by the chemical protective agent used in the oil vapor. The discussion of the use of alloys for corrosion protection is limited to this one admonition on the relationships which may exist between alloy and chemical corrosion protection.

Chemical Methods of Preventing Corrosion

To control the hydrogen-chloride and hydrogen-sulfide corrosion of distillation equipment, the amount of these corrosive agents which will be released during distillation of a given crude must be determined. Fair accuracy is required in this determination, inasmuch as the data from this test will be the basis for determining the amount of neutralizing chemical to be used. The amount of hydrogen chloride and hydrogen sulfide released on distillation of the crude oil may be determined either by analysis of the effluent streams from the distillation equipment for the chloride and sulfide content or by the direct measurement of the hydrogen chloride and hydrogen sulfide which will be released by distillation in our laboratory test method (method No. 2).

TABLE 1—CONCENTRATIONS OF HYDROGEN CHLORIDE AND HYDROGEN SULFIDE

Curve	A	B	C	D	E	F
Concentration						
HCl N	0.01464	...	0.01464	0.051	...	0.01464
H_2S N	.....	0.00354	0.00354	0.00354	0.0788	0.0788
Ammonia Equivalent						
Ml. of 0.01101 N:						
Chloride ion, Cl	13.3	...	13.3	46.3	...	13.3
Acid sulfide, HS	.....	1.6	1.6	1.6	35.8	35.8
Sulfide, S	.....	3.2	3.2	3.2	71.6	71.6
Total Ammonia (Cl+S)						
To acid sulfide	.....	1.6	14.9	47.9	35.8	49.1
To sulfide	.....	3.2	16.5	49.5	71.6	84.9

The determination of the quantities of corrosives by the analysis of the effluent streams is too complex for control purposes, but is essential for the obtaining of basic data from which accurate control methods may be developed. Laboratory methods, as a rule, do not give the same hydrogen-chloride and hydrogen-sulfide release as a commercial unit. It is, therefore, necessary to obtain correction factors by the detailed analytical determination of corrosives from the commercial equipment for comparison with data from the laboratory method.

There seems to have been little work reported on the formation of hydrogen chloride by the hydrolysis of the alkaline-earth chlorides under conditions similar to those existing in crude distillation. It is known that magnesium chloride is probably the main offender; but there is, for example, a question as to whether calcium chloride produces free hydrogen chloride by hydrolysis in crude-oil distillation.

By using our control method (method No. 2) for the determination of the release of hydrogen chloride from the distillation of crude oil, a general idea may be obtained as to the relationship between hydrogen-chloride release and salt content. An Oklahoma crude was water-washed and filtered until it was free of chlorides. It showed no hydrogen-chloride release by method No. 2. Various quantities of magnesium chloride were added to the crude, and the hydrogen-chloride release on distillation was determined. The results are given in Fig. 4. A magnesium-chloride content of 150 pounds per 1,000 bbls. gave a hydrogen-chloride release of 45 pounds, which is equivalent to 39 per cent complete hydrolysis. At lower concentrations, for example, below 5 pounds of magnesium chloride, the results are less reproducible, but indicate complete hydrolysis of the salt. The dotted line indicates the theoretical hydrogen-chloride release for complete hydrolysis. It should be realized that these data are for but one set of conditions, and may be varied widely by the conditions of test.

Sodium chloride and calcium chloride, both alone and in the presence of magnesium chloride, in crude oil were studied to determine whether they would hydrolyze and release hydrogen chloride on distillation. Sodium chloride, either alone or with magnesium chloride, proved to be inert, as was expected. Calcium chloride alone, in concentrations up to 200 pounds per 1,000 bbls., showed practically no hydrogen-chloride release — the quantity released being only about one-half pound per 1,000 bbls. and, therefore, within the error of a blank determination. In the presence of both magnesium chloride and calcium chloride up to 30 pounds per 1,000 bbl. of calcium chloride, the hydrogen-chloride release was substantially the same as shown in Fig. 4 for magnesium chloride alone, the calcium chloride apparently having no effect.

When very large quantities of calcium chloride, i. e., 200 pounds per 1,000 bbls., were present with magnesium chloride, there seemed to be a suppression of the hydrolysis of the magnesium chloride—less hydrogen chloride being released than for the corresponding amount of magnesium chloride alone. The results were erratic; and, as the salts in high concentrations were added to the crude in solid form, the hydrolysis-suppression data are questioned. It is evident that extensive study of the salt systems in crude oil is needed before a full understanding of the hydrogen-chloride release during crude distillation is obtained.

It is apparent, however, that the presence of magnesium chloride is highly detrimental, but corrosion prevention may be accomplished either by salt removal, as previously described, or by chemical neutralization, as for example, by ammonia.

Use of Ammonia to Prevent Corrosion

Ammonia has proved to be the most satisfactory neutralizing chemical for hydrogen-chloride and hydrogen-sulfide corrosion, and the trade literature amply covers the mechanics of its use in many successful installations.[1, 7, 8, 9] There is, however, a wide difference of opinion as to the correct amount of ammonia to use. The minimum use reported is that required to neutralize the hydrogen chloride only, while the maximum represents a surplus over the equivalent quantity required for neutralization of both the hydrogen chloride and the hydrogen sulfide.

In an all-iron system, such as that described by Puckett,[7] complete protection of the iron may be obtained by the use of a large excess of ammonia—probably neutralizing to a pH as high as 9.0. In an all-iron system this is certainly the most positive and simplest method of protection, and is economical unless large volumes of ammonia must be used to neutralize excessive amounts of hydrogen sulfide. In such case, however, the quantity of ammonia may be decreased until an economic balance is reached between cost of iron loss vs. cost of ammonia.

In most refineries, however, the crude distillation system includes both iron and copper alloys, such as admiralty metal or red brass. The use of such copper-bearing alloys greatly complicates ammonia control; but, regardless of this, these copper alloys are frequently necessary because of bad water conditions. The brasses as a whole are relatively safe from corrosion under substantially acid conditions, but are rapidly attacked under alkaline conditions[10]—thus making it impossible to add large amounts of ammonia for complete iron protection.

The literature indicates a wide diversity of opinion as to the safe amount of ammonia to be used in a distillation system containing brass. Some report safe use of the brasses in an ammonia-protected system with a pH as high as 8.5, while others report rapid attack with a pH as low as 7.5. The manufacturers of brass tubes usually recommend pH values less than 7.5 for protection of the copper alloys. Most references indicate that a higher pH than 7.5 is required for the protection of iron.

This difference of opinion may arise through a lack of understanding of the relationships between pH and the quantity of corrosive chemicals present, and to the mechanics of ammonia-sulfide attack on brass. Admiralty metal has been found to be relatively free from attack by large volumes of hydrogen sulfide, provided hydrogen chloride is absent or has been neutralized. If, however, sufficient ammonia is used to neutralize

the hydrogen sulfide, the brass is rapidly attacked. Preliminary tests indicate that this probably is due to the fact that the ammonium sulfides dissolve or disintegrate the protective copper-sulfide film which is formed on the copper in the simple hydrogen-sulfide-copper system. This reaction is accelerated in the presence of free oxygen.

Control of Ammonia by pH of Streams

For a theoretical study of the pH scale, the reader is referred to such authorities as Taylor.[1] However, a few of the fundamental principles may be reviewed to clarify the subsequent discussion. The pH scale is a measure of the hydrogen-ion concentration or the "acidity" vs. "alkalinity" characteristics of a system. It does not measure the quantity of acid, alkali, or salt present. Water solutions of salts of strong acids and strong bases (which are slightly hydrolyzed) and salts of weak acids and weak bases (extensively hydrolyzed) have a neutral reaction, i. e., a pH of 7. In the case of salts of strong acids and weak bases, the solutions are acidic in character, i.e., they have a low pH value which depends upon the concentration of the salt. Thus a 0.01 N solution of ammonium chloride shows a pH value of 5.6. In like manner, salts of weak acids and strong bases give high pH values.

Figures 5 and 6 have been prepared to show the relationship between pH and the amount of ammonia required to neutralize several systems of hydrogen chloride and hydrogen sulfide. Curves A, B, and C (Fig. 5) represent the actual concentration of the chlorides and sulfides found in the condensate from a crude distillation still. Curves D and E to F show the effect of greater quantities of hydrogen chloride and hydrogen sulfide, respectively, than the concentrations reported in curves A, B, and C. Solutions of hydrogen chloride and hydrogen sulfide of the concentrations given in Table 1 were prepared, and the number of milliliters of 0.1101 N ammonia required to give a pH range of 5 to 9 was determined, using 100 ml. of original solution. The resulting curves give a measure of the relative amounts of ammonia required to neutralize the hydrogen-chloride-hydrogen-sulfide systems to any desired pH. The pH data diverge slightly from a theoretical buffer solution because of the increase in volume due to the ammonia solution used.

Curve A shows the ammonia required to neutralize the straight hydrogen chloride. From a pH of 5.6, where the equivalent quantity of 13.3 ml. of ammonia solutions was required, down to a pH of 8, less than 1 ml. of the ammonia solution was required. At 8.5 only 2.2 ml. more than the equivalent was needed. However, beyond a pH of 8.5 large amounts of ammonia are required to raise the pH a slight amount, showing the buffering effect of the ammonium chloride.

Curve B gives the ammonia requirement for the pure hydrogen-sulfide solution. A very rapid rise in pH results from small increments of ammonia, until the acid-sulfide equivalent is reached with 1.6 ml. at 9.1 pH. Thereafter the ammonia requirement increases rapidly, showing that the full sulfide equivalent is reached at 9.5 pH. Curve C shows the ammonia requirement for the combined hydrogen-chloride-hydrogen-sulfide system. It follows curve A closely. At 8.5 pH the total hydrogen-chloride-hydrogen-sulfide equivalent is reached at 16.5 ml. Curve D shows that a more highly concentrated hydrogen-chloride solution gives a similar curve.

We can, therefore, conclude that, in a system composed of appreciable hydrogen chloride but only a trace of hydrogen sulfide, ammonia may be used to reach a pH of 8 to 8.5 with very little surplus ammonia used over that required to neutralize the hydrogen chloride. With this pH of 8 to 8.5 in an iron-copper-alloy distillation system, there would probably be little or no attack on copper alloys, and the iron would be fully protected.

Fig. 6 gives the effect of a higher concentration of hydrogen sulfide with the same hydrogen-chloride concentration shown in Fig. 5. Curve A is the same straight hydrogen-chloride titration reported in Fig. 5, while curve E is the titration of the straight hydrogen-sulfide solution (22 times the concentration of that in B of Fig. 5). Curve F is the titration curve for the combined hydrogen-sulfide-hydrogen-chloride system. Here we find a very different condition when comparing the hydrogen-sulfide-hydrogen-chloride solution curve with the straight hydrogen-chloride solution curve. Even at a pH of 5.6, more ammonia is required than the hydrogen-chloride equivalent. With higher pH values the ammonia requirement increases rapidly, until at a pH of 8.5 practically twice as much ammonia has been used as was required for the hydrogen-chloride neutralization. This large excess of ammonia in the form of the acid sulfide would cause rapid attack on the copper alloys. A study of curve F shows that, if corrosion of copper alloys by ammonia is to be avoided, the pH should be kept below 6. This pH of 6, however, is definitely too low for iron protection.

In this last system it is impossible to protect both the iron and the copper alloys with ammonia. Under this condition the most logical thing to do is to change to an all-iron system to permit the use of an excess of ammonia. Another

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expedient which has proved successful with hydrogen chloride and large volumes of hydrogen sulfide is to use a water-jet condenser and so to flood the condensate system with water that the hydrogen chloride and hydrogen sulfide are diluted past the danger point. This last expedient has worked reasonably well at our Artesia, N. M., refinery.

Example of Ammonia Method

Our No. 5 Foster Wheeler crude still at Ponca City, Okla., may be used as an example of the use of the ammonia method for the corrosion protection of crude distillation equipment containing both iron and copper alloys. The equipment consists of a 10,000-bbl.-per day single-flash single-tower Foster Wheeler unit. The operation involves the reduction of Oklahoma City crude to a 40-per cent bottom. The flash temperature is 600 deg. F.

The corrosive agents consist of hydrogen chloride with only a small quantity of hydrogen sulfide. The salt content is relatively high—82 pounds per 1,000 bbl. Serious trouble from deposition of salt in the heat-exchanger system is overcome by maintaining sufficient pressure to prevent the vaporization of the water. No desalting operation is used.

Table 2 summarizes the data required for the proper control of the corrosion in the system under discussion. The hydrogen-chloride release of 3.15 pounds per 1,000 bbl. is ample for severe corrosion if not neutralized, but the hydrogen-sulfide production is so low that it is negligible. The concentration of hydrogen chloride and hydrogen sulfide in the water is that given in curve C, Fig. 5. In view of the low hydrogen-sulfide content, sufficient ammonia is used to give a pH value of 8.5. The ammonia injection, based on hourly pH readings, is controlled to give a resultant pH value of 8 to 8.5 on the effluent water.

From Table 2 it will be seen that the hydrogen-chloride release as determined by the laboratory is higher than that found on the unit. This is at least partly due to the low flash temperature (600 deg. F.) of this particular operation. Rather than vary the laboratory procedure to decrease the hydrogen chloride released, we use the standard procedure and multiply the results by a factor (0.67 in this case) to estimate the probable release on the commercial operation.

TABLE 2

	Pounds Per 1,000 Bbl.
A. *Quantity of Corrosives Released:*	
1. By analysis of effluent streams:	
a. Hydrogen chloride	3.15
b. Hydrogen sulfide	0.36
2. By laboratory distillation:	
a. Hydrogen chloride	4.6
b. Hydrogen sulfide	0.46
B. *Ammonia Requirements:*	
1. Theoretical equivalent based on (A-1):	
a. For hydrogen chloride	1.47
b. For hydrogen sulfide	0.36
Total	1.83
2. Actual ammonia injected into still	2.00
C. *Characteristics of Water Condensate:*	
1. Volume, gallons per 1,000 bbl. of crude	708
2. pH value	8.5
3. Normality of hydrogen chloride	0.01464
4. Normality of hydrogen sulfide	0.00354

Rate of Corrosion

Due to rather severe water conditions, it is necessary to use copper-bearing alloys in the condensers and coolers. Both steel and admiralty tubes are used in heat exchangers. The maintenance records show the probable average tube life for the various services and metals to be:

1. Vapor to crude exchangers:
   a. Admiralty metal—practically indefinite life—more than 5 years.
   b. Steel, on heavier streams—10 to 20 months.

STANDARD BUFFER SOLUTIONS OF CLARK AND LUBS[11]

(50 ml. A plus x ml. B diluted to 200 ml.)

A=0.2 M KH o-phthalate, B=0.2 M NaOH		A=0.2 M KH_2PO_4, B=0.2 M NaOH		A=0.2 M H_3BO_3* Plus 0.2 M KCl, B=0.2 M NaOH	
pH	ml. B	pH	ml. B	pH	ml. B
4.0	0.40	5.8	3.72	7.8	2.61
4.2	3.70	6.0	5.70	8.0	3.97
4.4	7.50	6.2	8.60	8.2	5.90
4.6	12.15	6.4	12.60	8.4	8.50
4.8	17.70	6.6	17.80	8.6	12.00
5.0	23.85	6.8	23.65	8.8	16.30
5.2	29.95	7.0	29.93	9.0	21.30
5.4	35.45	7.2	35.00	9.2	26.70
5.6	39.85	7.4	39.50	9.4	32.00
5.8	43.00	7.6	42.80	9.6	36.85
6.0	45.45	7.8	45.20	9.8	40.80
6.2	47.00	8.0	46.80	10.0	43.90

*Molecular weight of boron, 11.0.

2. Condensers and coolers:
   a. Admiralty metal—12 months—all failures due to de-zincification from water side. No failures from vapor side.
   b. Red brass—no failures after 18 months.
   c. Nickel-aluminum bronze—one tube failure in 30 months of service.

Formerly, admiralty metal was used in all condensers and coolers; but, due to the short life caused by de-zincification from the water side, all replacements during the last 18 months have been with red brass. The long life of admiralty in exchangers indicates that this copper alloy is safe with a pH of 8.5 maximum with the reported concentrations of chlorides and sulfides.

Although we have not had failures of the red brass, there are indications that a slow attack from the vapor side is taking place. The condensate carries a trace of copper. On another unit, under similar conditions, we have had a few failures of red brass from the vapor side. The estimated life obtained by extrapolation on probability paper[12] is from 42 to 60 months.

It, therefore, appears that under these conditions a pH of 8.5 is too high for red brass, but a lower pH causes an increased attack on steel. We have not as yet determined the relative economy of a lower pH.

The experimental bundle of nickel-aluminum bronze is showing excellent results, and may be a solution to this particular problem.

Although a pH of 8.5 appears safe for admiralty and fairly safe for red brass on this installation, it should be remembered that this is true only because of the low hydrogen-sulfide release. At other plants with more hydrogen sulfide, we have observed very rapid loss from red brass with pH's of 7.5 to 8.0. It, therefore, appears that the question of ammonia control by pH must be determined for every individual unit and for each particular crude.

Appendix

Method No. 1 To Determine the Halogen Salt Content of Crude Oil as Sodium Chloride

Apparatus

a. 1,000-ml. separatory funnel.
b. 100- and 250-ml. graduated cylinders.
c. 250-ml. Erlenmeyer flask.
d. Burette, filter paper, funnels, hot plate, etc.

Solutions

a. Phenol solution: 88-per cent USP phenol in 12 per cent water, must be clear and colorless; keep in brown bottle.
b. Benzene or toluene, technical grade.
c. Standard 0.04881 N silver nitrate ($AgNO_3$) (8.293 g. $AgNO_3$ per liter. 1 ml.=20 lb. sodium chloride per 1,000 bbl.).
d. Cadmium nitrate ($Cd(NO_3)_2$—10-per cent solution in water.
e. Potassium chromate (K_2CrO_4)—5-per cent solution as indicator.
f. Sodium-hydroxide solution, ½ per cent.
g. BDH* Universal indicator.

Procedure

a. Transfer exactly 125 ml. of the oil sample under test (after thorough agitation) into the separatory funnel.

*British Drug House, Ltd.

b. If the oil is very viscous, add 125 ml. benzene or toluene. Thoroughly agitate to mix the oil and benzene. With most crude oils lighter than 34 API gravity, the solvent is unnecessary.

c. Add 200 ml. of boiling distilled water, and shake gently for 3 min. Frequently relieve pressure by opening the stop cock of the inverted funnel. Add 20 ml. of phenol and 30 ml. of boiling distilled water, and shake for 5 min.

d. Allow the mixture to stand until more than 100 ml. of clear-water solution has separated. Filter off exactly 100 ml. of the water into a graduated cylinder through two sheets of heavy qualitative filter paper.

e. If negligible quantities of sulfide and mercaptans are present, transfer the 100 ml. of filtered solution to an Erlenmeyer flask; adjust to 6.5 pH, and add 2 ml. of the chromate indicator. Titrate the cold (not over 85 deg. F.) solution with 0.04881 N $AgNO_3$ to a light orange end point, using a blank of water and chromate for color comparison.

f. If either sulfides or mercaptans or both are present, they must be removed before the chlorides can be determined. The 100 ml. of solution from (d) is transferred to a 250-ml. beaker, 1 ml. Universal indicator added, and the solution adjusted to a pH of 6.5-7.0 (light greenish yellow). The sulfides and mercaptans are precipitated with a slight excess of $Cd(NO_3)_2$. Allow to stand 30 min. and transfer to centrifuge tube. Centrifuge until the solution is clear and the precipitate is a dense, firm mass. Decant the clear solution to the Erlenmeyer flask, filtering if necessary. Rinse the beaker with 10 ml. distilled water into the centrifuge tube. Thoroughly wash the precipitate by shaking, and re-centrifuge. Decant the clear wash water into the solution in the Erlenmeyer flask, and adjust to exactly 6.5 pH (yellow). Titrate for chlorides as in (e).

Calculation

(ml. $AgNO_3$—ml. blank)×20=lb. NaCl per 1,000 bbl.

This relationship is true only if the exact volumes and concentrations are used. If the determination is desired in other units, the $AgNO_3$ solution may be adjusted accordingly. [Thus, ml. of 0.05379 N $AgNO_3$ (9.138 g. per liter)=10 g. NaCl per barrel.]

Discussion

a. The use of phenol and the aliquot portion of solution results in a rapid determination suitable for control purposes. The phenol not only gives rapid separation of the water layer, but also promotes the extraction of asphalt or wax-protected salt crystals from the crude. A similar method has been suggested by Blair[14] in which a special "de-stabilizer" is used in place of phenol. The use of the first 100 ml. of solution as an aliquot part has been justified experimentally by separating all of the wash water and analyzing successive portions for chloride content. If the crude oil contains appreciable free water, the aliquot portion should be corrected.

b. In the case of most "sweet" crudes the cadmium separation is unnecessary. If, however, a dark precipitate appears when starting the silver-nitrate titration, the presence of sulfides is indicated. In the case of unknown crudes, a second small aliquot portion of water from the separatory funnel may be checked with $Cd(NO_3)_2$ solution before proceeding with the determination.

c. The success of the cadmium removal of the sulfides and mercaptans depends on the exact adjustment of the pH values. In solutions with a pH value slightly lower than 6.5, the precipitation of the

mercaptans is not complete, and some chloride may be carried down with the sulfide.

d. The BDH Universal indicator is recommended, as it permits the adjustment to both 6.5-7.0 and to 6.5 pH. At the latter value it is a clear yellow, which does not interfere with the chromate indicator. If, after the addition of the indicator, the color is not a bright yellow, the solution can be adjusted to 6.5 pH by comparing the color with a blank of water and chromate.

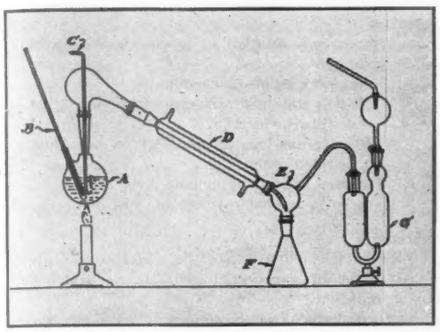

Fig. 7

Method No. 2 To Determine Hydrogen Chloride and Hydrogen Sulfide Released from Crude-Oil Distillation

Apparatus

The apparatus consisting of an interchangeable ground-glass joint assembly for steam distillation is shown in Fig. 7, and includes:

a. Long-neck 1,000-ml. flask with thermometer well.
b. Thermometer well and high range ASTM distillation thermometer (D 86-35).
c. Adapter neck and steam-delivery tube and source of steam.
d. 18-in. jacketed water-cooled condenser.
e. Special adapter.
f. 500-ml. Erlenmeyer flask receiver.
g. ASTM absorber (D 90-34T).

Solutions

a. Sodium carbonate, 3.606 g. Na_2CO_3 per liter.
b. Standard hydrochloric acid, 0.08623 N.
c. Hydrochloric acid, 0.2 N.
d. Hydrochloric acid, 4.0 N.
e. Potassium hydroxide, 5 per cent KOH.
f. Cadmium nitrate, 10-per cent $Cd(NO_3)_2$.
g. Standard silver nitrate, 7.328 g. $AgNO_3$ per liter.
h. Standard iodine solution, 0.09227 N I_2.
i. BDH Universal indicator.
j. Potassium-chromate indictor, 5 per cent K_2CrO_4.

Procedure

A. *For hydrogen chloride only:*

a. Deliver 500 ml. of crude oil to be tested into the flask (A) and assemble equipment.

b. The Erlenmeyer flask receiver (F) is empty, but the absorber (G) should contain exactly 45 ml. Na_2CO_3 solution (3.306 g. per liter).

c. Heat is applied, and the temperature raised to 250 deg. F. in 10 min.

d. Steam is introduced into the flask, and so regulated that approximately 40 ml. of water condenate will form throughout the distillation.

e. The temperature is raised at such a rate that 500 deg. F. will be reached in 30 min. and 650 deg. F. in an additional 15 min. (total time from starting of heating, 55 min.).

f. Upon reaching 650 deg. F. the heating and steam injection is immediately stopped.

g. The condensate in the receiver is transferred to a separatory funnel and, after shaking, the water layer is drawn from the distillate into the absorber (G). Two 15-ml. distilled water washes are used to rinse the receiver (F) and to wash the gasoline in the separatory funnel. During shaking, the funnel should be kept stoppered except for occasional ventings to relieve pressure. Transfer the wash water to the absorber.

h. Make the total volume in the absorber up to about 150 ml. and back titrate with standard hydrochloric acid (0.08623 N) using methyl orange as an indicator. Make a blank titration of the hydrochloric acid against 45.00 ml. of the sodium-carbonate solution.

Calculation:

(ml. HCl for blank—ml. HCl for titre) =g. HCl per barrel of oil.

or

(ml HCl for blank—ml. HCl for titre)×2.2 =lb. HCl per 1,000 bbl.

B. *For both hydrogen chloride and hydrogen sulfide:*

a. Place 50 ml. of 5-per cent potassium hydroxide in both the receiver (F) and the absorber (G).

b. Proceed with the distillation as in (A).

c. Transfer the solution from the absorber (G) into a 400-ml. beaker, and rinse the absorber with two 15-ml. washes of distilled water.

d. Transfer the contents of the receiver (F) to a separatory funnel, shake thoroughly, settle, and draw the solution into the same beaker (C). Rinse the receiver and the gasoline with two 15-ml. washes of distilled water, and transfer the wash water to the beaker.

e. Carefully neutralize the solution to a pH of 6.5-7.0 with dilute nitric acid; then precipitate the sulfide and mercaptans with a small excess of cadmium-nitrate solution. Let stand 30 to 60 min. as a filtering aid. Filter through quantitative filter paper. Wash sparingly with cold distilled water, adding the wash water to the filtrate.

f. Readjust the filtrate to a pH of 6.5, add 2 ml. of chromate indicator, and titrate with silver nitrate.

Calculation:

(ml. $AgNO_3$—ml. blank)×1.1 =lb. HCl per 1,000 bbl. of crude oil.

g. The cadmium sulfide and mercaptides are sepa-

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rated by washing the precipitate on the filter paper with a small volume of 0.2 N hydrochloric acid, which decomposes and dissolves the mercaptides. The volume of acid required depends upon the quantity of mercaptans present, and should be determined by experience for any given crude. The precipitate is washed repeatedly by returning the acid filtrate to the precipitate, which should be stirred while washing, to obtain complete removal of the mercaptides. Finally, sparingly wash the precipitate with distilled water, and discard the washings.

h. The remaining precipitate consisting of cadmium sulfide is transferred with the filter paper to a beaker; add 100 ml. distilled water; disperse the precipitate in the water by thorough stirring. Add 20 ml. of 4 N hydrochloric acid (to make the total solution 0.6 N HCl) and titrate the liberated hydrogen sulfide with standard iodine solution, using starch as an indicator.

Calculation:

(Total ml. I_2—ml. blank)×1.1=lb. H_2S per 1,000 bbl.

Discussion

a. For routine control work, where only the hydrogen-chloride release is required, procedure (A) is rapid and more reproducible than the more complex methods requiring the separation of hydrogen sulfide and mercaptans. The latter do not interfere with the titration of hydrogen chloride to a methyl-orange end point.

b. Hydrogen sulfide and mercaptans interfere with all the usual chloride determinations using silver or mercury. If the quantity of hydrogen sulfide is desired, the cadmium separation will be satisfactory if care is taken to have the solution acidities exactly as specified. When very large volumes of hydrogen sulfide and mercaptans are present and the hydrogen-chloride content low, the cadmium precipitate will sweep down some chloride—thus lowering the quantity of hydrogen chloride found. In such cases a check distillation by procedure (A) may be made for the true hydrogen-chloride release.

It is also possible to separate the chlorides from the sulfide and mercaptans by taking an aliquot portion of the original solution (B-d) for each determination. One part is used to determine hydrogen sulfide by the cadmium method. The second portion is neutralized, and an excess of silver-nitrate solution added to precipitate the chlorides (about 10 ml. more than needed for the hydrogen chloride). Add concentrated nitric acid to increase the volume by one-third, and boil to decompose all sulfide and mercaptides. Cool and back titrate with standard ammonium-thiocyanate solution, using ferric alum as an indicator according to the standard Volhard procedure.

Method No. 3—For Determination of Sulfur-Dioxide Release from Acid-treated Distillates

Apparatus

Similar to that in Fig. 7, except that a 500-ml. graduated cylinder is used in place of the receiver (F).

Procedure

Caustic-soda solution is used in both the receiver and absorber; 500 ml. of distillate is charged to the flask, and heated to above the boiling point of water. Steam is cut in at a rate equal to the steam ratio to distillate used in the plant (30 pounds per barrel).

The temperature is gradually raised to the maximum temperature reached in the commercial unit (415 deg. F.). Distillation is continued until the predetermined yield of gasoline or distillate has been received in the graduate.

The receiver is thoroughly shaken, and the caustic solution transferred to the absorber. The solution is neutralized, and the sulfur-dioxide content determined iodimetrically.

The distillation conditions may be varied to match any given commercial operation. In actual practice the laboratory has been found to check the sulfur-dioxide release in the commercial equipment within 2 per cent.

Method No. 4—To Determine the Iron Content of Distillate

Apparatus

a. 250-ml. Erlenmeyer flask.
b. 100-ml. graduate.
c. 1-ml. dropper.

Solutions

a. 30-per cent solution of concentrated hydrochloric acid.
b. Ferroferricyanide indicator:
   10 g. potassium ferrocyanide in one liter of distilled water.
   10 g. potassium ferricyanide in one liter of distilled water.
c. Standard iron solutions of such concentration to cover probable range of iron to be found.

Procedure

To a sample of 90 ml. of the water condensate is added 10 ml. of 30-per cent hydrochloric acid and 1 ml. of indicator.

The resultant color is compared with the standard iron solutions to determine iron content.

Discussion

For routine control it has been found desirable to test the condensate hourly. The iron standards may be in any desired units, but the use of "pounds iron loss per 24 hours" has proved very successful.

Method No. 5—pH of Condensate

Although any form of electrometric or indicator method may be used for the routine determination of pH, and although we use the electrometric methods in the laboratory, we have found them too delicate and complicated for the average still operator. The use of a mixed or "Universal" indicator has proved very successful and, if used by comparing with standard buffer solutions, is accurate to 0.2 pH.

We use and recommend the BDH Universal indicator put out by the British Drug House, Ltd., and

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5.0	orange red	9.0	greenish blue
5.5	orange	9.5	blue
6.0	orange yellow	10.0	violet
6.5	yellow	10.5	reddish violet
7.0-7.5	greenish yellow	11.0	deeper violet

0.1 ml. of indicator is used per 10 ml. of solution.

For accurate pH determinations, particularly in artificial light, the color of the unknown solution should be compared with standard buffer solutions containing the same concentration of indicator. Clark and Lubs'[13] * buffer solutions have proved stable and accurate to 0.02 pH against a Beckman glass electrode instrument.

In routine control the stillman is furnished with the indicator and a 10-ml. calibrated test tube in which the condensate is checked hourly. Two standard buffer solutions, representing the minimum and maximum permissible pH values, are furnished in similar tubes. If the pH is outside the given range, the operator can tell by the color whether the pH is higher or lower than the range. The buffer colors should be checked weekly.

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*See tabulation.

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Every phase of the oil business, beginning at the time a well is spudded in, down through its drilling period, production, transportation, refining, and marketing, is covered. Production and pipe line features were taken in the East Texas field and on the Gulf Coast. Water terminal scenes were photographed on the Gulf aso. The refining portion of the story was taken at Sun's Marcus Hook plant, where the mercury vapor phase lubricating plant was featured.

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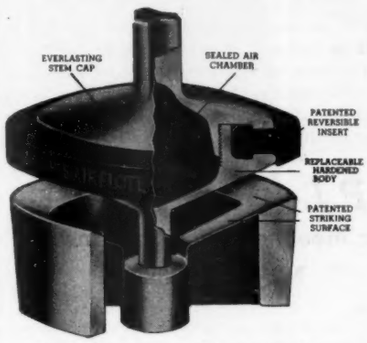

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Conservation of Gravity in Production of Oil

By S. F. MAUNEY, JR., and
Carter Oil Co.
G. M. VANDAVEER, JR.
E. H. Moore, Inc.

Conservation of gravity in the production and handling of oil not only effects a saving of volatile portions, but also of volume, since any loss in gravity of crude oil means a decrease in volume. It is, therefore, a true form of conservation. Much attention and publicity has been given to conservation of crude oil from the standpoint of supply and demand; application of more effective production methods; and the uses of secondary recovery methods; whereas conservation as related to gravity has, as a general thing, been sadly neglected. Many phases of this loss have been unrecognized and other phases, although recognized, have been considered "necessary evils." The losses that occur in producing, treating, storing and transporting crudes are insidious in that they are not visual and usually there is no readily apparent or convenient method

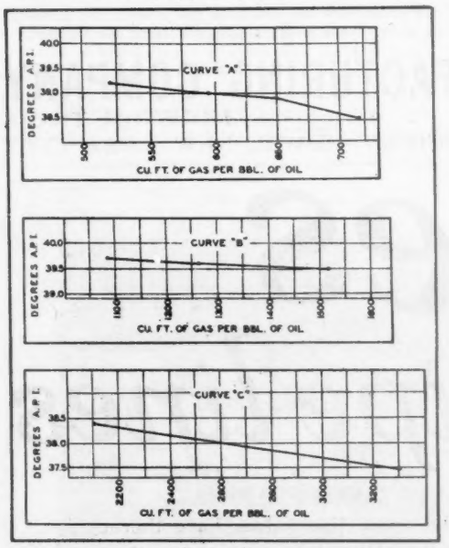

Fig. 1—Curves showing effect of gas-oil ratio on the gravity of crude

of determining the losses. This is particularly true of losses occurring in production and in lease treating and storage.

Spoken of in terms of percentage, the production and transportation losses seem small, but when translated into dollars they assume an enormous figure. Schmidt[1] states that Wiggins in 1921 estimated the average evaporation losses from well head to refinery as 6.2 per cent and divided them as shown in Table 1.

TABLE 1—RESULTS OF THE 1920-21 SURVEY OF BUREAU OF MINES SHOWING AVERAGE EVAPORATION LOSSES OF CRUDE PETROLEUM IN THE MID-CONTINENT FIELD

Location of loss—	Average per cent evaporated
Flow tank	1.0
Filling lease tanks	1.0
Lease storage	1.5
Gathering systems	1.0
Transportation	1.0
Tank farms	.7
Total	6.2

Schmidt[1] conservatively estimates that losses from well to refinery have been cut from 6.2 per cent in 1921 to approximately 2 per cent in 1934. The authors believe that this figure is entirely too small for 1934 and even for 1938, since on many leases, by attention to treating and storage, it has been possible to save more than 2 per cent by volume. However, applying 2 per cent to the daily Mid-Continent production of 1,910,000 bbls., the loss amounts to 40,000 bbls., which at $1.22 (36-gravity oil) amounts to $48,800. More than 50 per cent of the losses occur on leases where gravity affects price and the estimated evaporation loss indicates approximately a .4-degree loss in gravity, which means that probably one-third of the production is changed to a lower gravity bracket, thereby losing 2 cents a barrel in price. This amounts to a further daily loss to Mid-Continent producers of $6,400, which, added to the value of the volume loss makes a total daily estimated loss of $55,200. This estimated value does not represent the true loss, since the portion evaporated is gasoline, which is much more valuable than the average price for crude indicates. And, too, these estimated losses are not the only ones to be considered since some material losses occur with certain methods of production such as gas-lift, flowing with high gas-oil ratio, etc.

***A.P.I.*—Presented at Mid-Year Meeting, Wichita, Kansas, May 24, 1938**

Schmidt[1] states that lease losses could be cut below 1 per cent by using properly maintained and efficiently operated tankage, but that only approximately 50 per cent of the decrease in evaporation loss is realized by the operators because of poor use of the provided equipment. The recognition of these losses and application of common-sense methods can result in enormous savings compared with the amount expended, since generally the first cost is the last cost in much of the gravity conservation work.

As mentioned above, certain methods have a direct and/or indirect effect on the gravity of the oil produced. In some instances, losses caused by production methods are partly recovered in gasoline plants, but considering the cost of this recovery; the nearness of the sale price of natural gasoline to crude; the increased transportation cost for the gasoline; and the greater evaporation loss occurring on the more volatile fluid, it is generally more profitable to retain as much gravity with consequent connected volume in the crude as possible.

In natural flowing wells, some control can generally be exercised over the rate of flow and the consequent gas-oil ratio. It is naturally very much in the interest of conservation to obtain as low a gas-oil ratio as possible for reasons other than conservation of gravity. However, gravity conservation goes hand in hand with low gas-oil ratios as shown by Figure 1. These values were determined by tests on three wells in the Fitts field and the curve shows values obtained in each well by changing the rate of flow with the consequent change in gas-oil ratio and gravity. Curves "a" and "b" are values determined from tubing flow, while curve "c" was determined from casing flow. With the fact in mind that lower gas-oil ratios mean higher gravity in any given well, it can be seen how additional conservation can be accomplished through the correct method of production.

Maintaining back pressure up to certain points on separators will generally result in crudes of higher gravity being delivered to the pipe lines. The results of some experiments made in the Fitts field and shown in Table 2 illustrate this.

On the A lease, the increased value per barrel for the 30-pound separator oil over the 15-pound separator oil was 5 cents and on the B lease the increased value was 6 cents which was

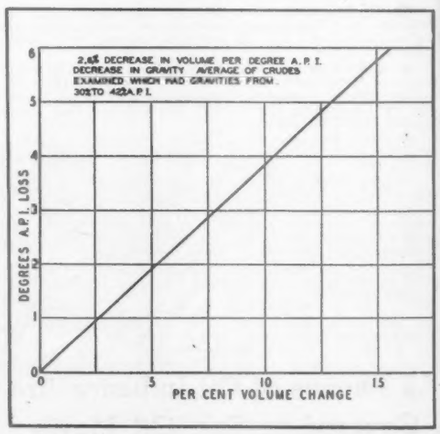
2.4% DECREASE IN VOLUME PER DEGREE A.P.I. DECREASE IN GRAVITY AVERAGE OF CRUDES EXAMINED WHICH HAD GRAVITIES FROM 30.8 TO 42.8 A.P.I.
DEGREES A.P.I. LOSS
PER CENT VOLUME CHANGE

Fig. 2—Gravity-volume loss relationship

due to the gravity and related volume saving. The gravity-volume relationship is shown in Figure 2.

Producing oil by gas-lift or plunger lift always results in considerable loss of gravity, however, this is usually partly regained at some expense by processing the gas at a gasoline plant. Examination of considerable data comparing gravity of oil produced by natural flow and gravity obtained from the small wells after gas-lift or plunger lift was substituted shows a general decrease from 1½° to 2° A.P.I. gravity.

Entrance of water into wells has a marked effect on gravity of oil regardless of the method of production due to the formation of emulsions which have to be treated with resultant evaporation. Water produced in natural flowing wells usually has a greater effect on loss of gravity than in pumping wells since the emulsions formed in flowing wells are generally "tighter," and therefore require higher treating temperatures. The percentage of water produced has a marked effect on the amount and "tightness" of the emulsion. Roberts[2] discovered that in agitat-

(Continued on Page 78)

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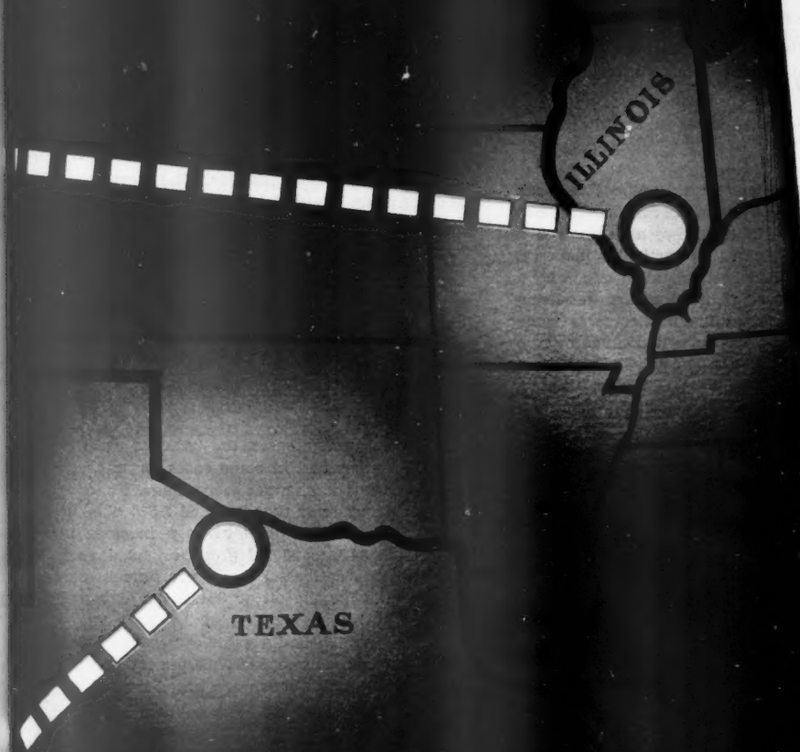

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TABLE 2—EFFECT OF PRESSURE ON SEPARATORS ON GRAVITY OF FITTS CRUDE (PRODUCING CONDITIONS AS NEAR ALIKE AS POSSIBLE TO MAINTAIN. TANKS WERE ALL LOW BOLTED 500 BBLS.)

Date	Time	Sample	A.P.I. gr. obs.	Temp. oil °F.	Corrected 60° F.
		Lease "A"			
		15# on Separator			
12-21-36	5:00 p.m.	Separator	38.6	54	39.1
12-21-36	12:00 p.m.	Stock tank (shut off)	38.6	52	39.2
12-22-36	8:00 a.m.	Stock tank	38.4	53	38.9
		30# on Separator			
12-22-36	5:00 p.m.	Separator	39.8	58	40.0
12-22-36	12:00 p.m.	Stock tank (shut off)	39.6	56	39.9
12-23-36	8:00 a.m.	Stock tank	39.4	56	39.7
		Lease "B"			
		15# on Separator			
12-21-36	12:00 p.m.	Separator	37.8	50	38.5
12-22-36	7:30 a.m.	Stock tank (shut off)	37.6	53	38.1
12-22-36	1:00 p.m.	Stock tank	37.4	57	37.6
		30# on Separator			
12-22-36	12:00 p.m.	Separator	38.6	54	39.1
12-23-36	7:30 a.m.	Stock tank (shut off)	38.6	57	38.8
12-23-36	1:00 p.m.	Stock tank	39.1	64	38.8

ing oil and water together with the water content less than 25 per cent resulted principally in a dispersion of water droplets in oil; with 25 to 31 per cent water, either type of dispersion; and above 31 per cent water, principally oil in water dispersion. Therefore, with no colloids present to stabilize oil in water dispersions (usual condition in crudes) the amount of emulsion formed with 31 per cent or more of water present is relatively small.

A survey made by Mr. Salnikov[3] in the Seminole area in 1932 found the general relationship of crude gravity to method of production as shown in Table 3.

TABLE 3—RELATIONSHIP OF GRAVITY TO METHOD OF PRODUCTION

Method of production—	Gravities A.P.I. @ 60°
Pumping well not producing water	41° and above
Natural flowing well producing no water	38 to 40°
Gas-lift wells producing no water	37 to 38°
Gas-lift wells producing water and emulsions heated and chemically treated	34 to 37°
Pumping wells producing water and emulsions heated and chemically treated	38 to 40°

The condition and type of flowing and pumping equipment has a considerable effect on the type and amount of emulsion formed, hence, indirectly influencing the gravity of the crude. Repair of leaky pumps and removal of constrictions that cause extreme agitation can prevent or decrease formation of emulsions. The use of bottom-hole chokes or the separation of water in high-pressure knockouts before passage through surface chokes can materially reduce or prevent the formation of emulsions. The use of "down the hole" treating in many instances decreases and/or causes the emulsion to be of a type that is easier to treat.

Although some preventable evaporation losses are occasioned by certain methods of production, the principal preventable losses occur in lease treating and storage.

One of the most successful means for accomplishing this work has been through the employment of full-time treating engineers. These engineers, acting in their capacity as supervisors, inspectors and cost accountants, carry out gravity conservation and treating programs with the help of the lease personnel and have demonstrated to the lease men savings that can be made through preventing gravity and volume losses.

One method for demonstrating and measuring losses is to secure a composite well-head sample and treat it cold in a closed container and compare its gravity with that shown on run tickets. Application of the gravity loss to a volume versus gravity curve, actually determined for that crude or applying the 2.6 per cent volume per degree, which is reasonably close for all crudes, shows the volume loss sustained. Another method is to make changes and compare gravities as shown on run tickets immediately preceding and following the changes or comparing run tickets on adjacent leases where the oil is produced by the same method.

The methods used for treating probably have greater effect on gravity loss than any other one phase of the oil production. Many obsolete and unscientific methods for treating oil are still carried on. In many instances, "rolling" tanks with gas or air to secure treatment results in about 1½ to 2° A.P.I. loss of gravity in the Seminole area. To prevent this loss, small portable pumps driven by air-cooled gas engines are used to circulate oil turned down by the pipe line back through the treating system. As an example, circulating acid-cut oil in the Jesse area showed a loss of only .4° A.P.I. In this particular instance, no treating system had been installed and a portable heater was moved to the location to accomplish the treating and although there was some expense involved in moving and connecting the pump and heater, the estimated savings over "rolling" amounted to $27 on 600 bbls. treated. Steaming, although still practiced in some instances, has finally been recognized as the poorest method for treating oil and has been abandoned in practically all cases.

The use of treating systems that are gas tight result in the largest retention of gravity in the crude, all other conditions being equal, and this is particularly true on systems where pressure can be maintained and heat exchangers used to cool the oil to atmospheric temperature before it goes to storage. A number of relatively new "unit treaters" possess these attributes and definitely show material savings in treating crude. They also have further advantages in that they dispense with the use of separators; and permit the gasoline plants to secure the rich vapors evolved in treating. Records kept on 30 "unit treaters" in the Seminole area, as compared to 10 conventional systems in the same field showed that the unit treaters had saved from gravity and volume alone approximately $6,000 for six months and this saving was made during the time in which, for certain operating reasons, no pressure was carried on the treaters. Comparative tests made with 5 to 9 pounds pressure on the unit treaters showed that the above saving would have been greatly increased had pressures been maintained during this period.

The use of high temperature treating to secure a saving in chemicals, as mentioned before, has been practiced to a large extent. In many instances, treating methods requiring relatively high temperatures were established during the flowing life and were continued into the pumping phase without lowering the temperature. A careful investigation in the Seminole area showed that the production on many leases could be "cold treated" (atmospheric temperature) with but a slight increase in the cost of chemicals. Records kept on these treating operations for one year have resulted in an estimated overall saving of $36,572 on 1,165,224 bbls. of oil treated, which is an average of 3.1 cents per barrel.

It was found that "cold treating" was not applicable to oil from all districts, but it was found that even in these districts, treating could be considerably lowered. The beneficial results secured in one district are shown in Table 4.

Another example of preventable losses that have occurred on leases and that are still occurring on some leases is shown by work that was done in a Rocky Mountain field in 1935. Tanks that had been in use several years and consequently were far from tight were made semi-gas-tight. The steaming method of treating was discarded and replaced by fluid heaters, in some instances small boilers, together with "wash" tanks which had wood baffles. The heaters in most cases heated the water in the bath of the wash tank which in turn heated the fluid produced by the wells. When tanks were steamed a close control of temperature was not kept which together with nontight tanks meant a considerable loss of vapors. With the tight tanks and a different method of treating temperatures were closely controlled by a system of overhead venting with pressure and vacuum valves the vapors that were released by the necessary heating were saved for the gasoline plant.

In a great many cases the gravity was increased 2 degrees and in some cases as much as 3 degrees after the changes were made. Changes were made in systems that handled 2,576 bbls. of oil daily with a consequent average increase in gravity from 34.5 to 35.8 degrees, or 1.3 degree. This represents at least 2 cents per barrel additional revenue for the oil or $51.52 per day and represents a volume increase of 3.4 per cent or 87 bbls. daily which had a value of $104.40. Thus, a gain of $155.92 daily or $4,677.60 per month was obtained. The results above are based on several months' operation during corresponding seasons of the year before and after the changes were made. There was a considerable saving in chemical also, however, this saving of chemical should not be emphasized as attempts to save chemical so often results in greater losses elsewhere.

The value of vapor-tight tanks alone in reducing evaporation losses is well shown by tests given by Wiggins in his "Methods of Decreasing Evaporation Losses of Petroleum," Technical Paper No. 319, U. S. Bureau of Mines, 1923, and which is quoted here from U. S. Bureau of Mines Bulletin No. 379:

"The value of vapor-tight tanks alone in reducing evaporation losses is shown by tests made

TABLE 4—REDUCED TEMPERATURE TREATING

J. Pool—Seminole Area

Month, Year	Bbls. oil treated	Chemical cost/bbl.	Average price/bbl.	Average gravity A.P.I.	Treating temp. °F.	Total gain $	Gain/bbl. $
Feb. 1937	74,531	.0092	$1.119	31.5	180	Base	Month
Mar. 1937	81,966	.0103	1.131	32.0	160	2028	.025
Apr. 1937	76,700	.0120	1.138	32.4	140	3238	.042
May 1937	76,615	.0121	1.138	32.4	130	3229	.042
June 1937	69,929	.0110	1.135	32.3	120	2610	.037
July 1937	69,384	.0110	1.136	32.4	120	2857	.041
Aug. 1937	65,799	.0111	1.134	32.2	110	2196	.033
Sept. 1937	60,919	.0111	1.133	32.2	110	1969	.032
Oct. 1937	62,313	.0109	1.136	32.3	140	2515	.041
Nov. 1937	57,185	.0079	1.142	32.5	150	3065	.054
Dec. 1937	58,001	.0091	1.141	32.5	150	2959	.051
Jan. 1938	55,647	.0098	1.141	32.4	150	2643	.048
Feb. 1938	46,518	.0099	1.138	32.3	150	1930	.042
Mar. 1938	48,836	.0076	1.129	31.9	150	1134	.023
Total and average	829,561	.0105	1.136	32.3	140	32427	.039

in 1920-21 by Wiggins to determine the effectiveness of vapor-tight tanks in reducing volumetric loss and lowering of the gravity of oil by evaporation. Three tanks of various degrees of tightness were used in one test. (1) An open tank with an ordinary sheet-steel roof (without gaskets between the roof seams), equipped with an 18-inch manhole in the center, and two 8-inch gauge holes without covers. (2) A tank with a sheet-steel roof, equipped with one '4-inch vent' 6 feet long, with gaskets along all seams and around the chimes and bolts spaced about 3 inches apart. (3) A 'small vent tank' fitted with an automatic pressure and vacuum regulator, with a roof of heavier metal than those of the other two tanks, gaskets along all seams and around the chimes, bolts about 2 inches apart. In the open tank, the oil was allowed to splash in through the manhole, but in the other two, the oil line was flanged to the top.

"The results of this test are given in Table 9. (See Table 5 in this paper.) The data shows that a loss of about 6 per cent occurred during the filling of the open tank and that this loss coincides with a loss in gravity of the oil of about 2.5° A.P.I. The results show also that the tighter the tank, the less loss in volume and change in gravity as the losses in the small vented tank were only about one-third of the corresponding losses in the open tank. Tests on these tanks while standing full show even greater savings for vapor-tight equipment."

Schmidt[1] states that tests have shown that the use of welded tanks with from 12- to 16-ounce pressure will incur only about one-third of the loss sustained in tight bolted tanks. It appears, then, that the logical tanks for lease storage would be welded tanks, where the size of the production does not make their use unfeasible. This is particularly true where old 55,000-bbl. tanks are available for furnishing steel to manufacture welded tanks, since the construction cost is relatively low. Welded tanks make an extremely flexible type of storage, since these tanks can be moved and set up for about $25 each, whereas it costs $175 to move and erect a low 500-bbl. bolted steel tank. A check in different areas has shown that approximately 1 degree of gravity is saved by using the welded tanks. Replacing large tanks erected on leases during flush production with small vapor-tight tanks commensurate with production has resulted in considerable savings. These savings are easily understood when it is observed that breathing losses are considerably greater on partially filled tanks than on full tanks and are almost a direct function of the time for relatively short periods under any uniform set of conditions.

The use of overhead vent systems and stack valves on risers has resulted in saving considerable gravity on storage tanks and this is particularly true on bolted tanks. Accurate figures on eight installations on bolted tank batteries that cost approximately $100 per unit showed an average monthly saving of $65 each during four months of operation. These savings were computed by comparing the increased gravities and consequent decreased volume losses during these months with the gravities secured during the same months of the year previous to the installation, with no changes in production methods having taken place.

Painting of lease storage with light colored paints has a material effect on the gravity of the oil delivered to the pipe line. A test made by one of the major oil companies during the summer of 1929 on two 55,000-bbl. tanks shows the effect of painting and/or insulation, and illustrates the fact that painting is practically as efficient as insulation alone. Two tanks, Nos. 701 and 703, built exactly alike, were used with approximately the same amount of oil in each tank.

TABLE 5—RESULTS OF COMPARATIVE EVAPORATION TESTS ON THREE LEASE TANKS WITH VARYING DEGREES OF TIGHTNESS

Tank—	Total time, days	Time actually receiving oil, days	Time not receiving oil, days	Average atmospheric temperature, °F.	Quantity evaporated: Bbls.	Quantity evaporated: Average per cent of vol.	Change in gravity: From °A.P.I.	Change in gravity: To °A.P.I.	Change in gravity: Loss °A.P.I.
LOSSES DURING FILLING									
"Open"	5	2	3	37	14.4	5.97	40.73	38.27	2.46
4-inch vent	5	2	3	37	6.0	2.55	40.73	39.70	1.03
Small vent	5	2	3	37	4.5	2.03	40.73	39.90	.83
LOSSES WHILE STANDING FULL									
"Open"	5	..	..	49.4	9.2	4.00	38.27	37.17	1.10
4-inch vent	5	..	..	49.4	2.8	1.26	39.70	39.37	.33
Small vent	5	..	..	49.4	1.8	.79	39.90	39.59	.31

TABLE 6—COMPARISON OF TANK TEMPERATURES

Dates inclusive:	No. of tank	Condition of tank—	Maximum temp., °F.	Minimum temp., °F.	Range °F.	Difference
July 1-11, 1929	701	Insulated, but not painted	103.3	79.2	24.1	
	703	Not insulated or painted	108.7	78.7	30.0	5.9
July 13-15, 1929	701	Insulated and painted	104.2	82.2	22.0	
	703	Not insulated or painted	116.2	81.7	34.5	12.5
July 27-Aug. 3, 1929	701	Insulated and painted	108.1	85.6	22.6	
	703	Painted only	109.6	84.3	25.3	2.7

No. 703 was uninsulated and unpainted and No. 701 insulated with one-half inch celotex and unpainted at first, but both painted at later steps of the experiment. Recording thermometers, with their bulbs placed in the vapor space in each of these tanks, kept a constant record on the temperatures. Although actual breathing losses were not measured, they are a function of the average temperature and the temperature range of the vapor space. Data is shown in Table 6.

Pipe line losses are principally incurred by air that is allowed to enter gravity gathering systems and then later expelled with its load of vapors at the gathering stations. The authors have actually observed suction pumps at the pipe line stations bringing in only air out of the lines for a period of as long as one hour. However, in recent months, one pipe line company has installed a successful shut off valve on all leases from which it is taking oil. This valve, invented by one of its operators, has practically eliminated this loss.

Another loss in pipe line transportation is the filling loss occasioned in filling cone roof working tanks. A careful estimate of the losses determined at one pipe line gathering station during the summer months and a similar series of experiments carried on during the winter months showed that this particular station could expect to lose from volume alone some $35,000 in filling losses in handling 9,000,000 bbls. of oil, at least $30,000 of which could be saved by installing floating roofs on working tanks at a cost of $9,000, which would leave a net saving of $21,000.

A batch of 41-gravity crude was followed through a whole pipe line system equipped with floating roofs and the results, determined by air Equilibrium Vapor Pressure Method on Composite Samples*, showed that .122 per cent loss was sustained on this batch in passing through eight pumping stations, whereas the same batch, in passing through one receiving station of another pipe line having a cone roof tank sustained a loss of .093 per cent. It was interesting in this experiment to note that the calculated equilibrium loss of filling the cone roof tank with this batch using the average temperature that existed was .129 per cent. This information tends to disprove the idea held by some that filling losses are greatly minimized by the fact that the evolved air fails to approach its maximum vapor carrying capacity.

Conclusion

It appears that a great many things may be done to conserve gravity with its consequent saving of volume. Knowledge of most of these things is general. However, it is apparent that many producers do not follow the best practices, particularly during periods of flush production. While it is true that many major problems present themselves during new or flush production periods it does seem that with the small expenditures and work required to institute gravity conservation methods and equipment that this could be done, in a large part, during the routine work of installing tankage, treaters and other equipment for producing, handling and storing petroleum. If it is worth while to make changes in existing equipment, which has been shown, it is certainly worth while to make original installations correctly. The benefits to be obtained by the oil industry as a whole mount into millions of dollars and in this day of slower return of investment they assume considerable importance.

*Composite sample taken of batch at starting point and vapor pressures determined with various per cents evaporated for a vapor pressure versus per cent evaporated curve. Applying vapor pressure of composite sample at receiving end gave per cent lost.

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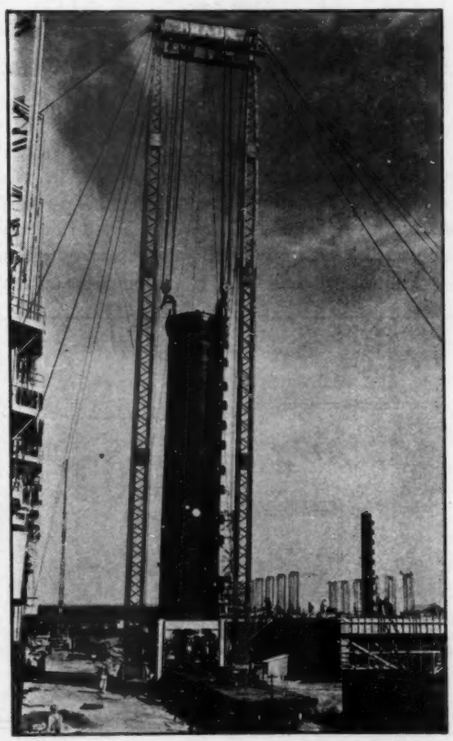


Eighty-five ton bubble tower being erected in Richfield Oil Corp.'s refinery at Watson, Calif. While the vessel is 65 feet high and 13 feet in diameter, larger vessels are under construction for use at this site. In the background are seen the foundations for the pump house and control room.

Operating Kinks W

Prizes, N.G.A.A. M

The importance of operating ideas, developed by men connected with work in the field, has been better appreciated this year. Evidence of this was to be observed at the "Kinks" session of the Natural Gasoline Association of America held on May 13 as part of the program of the association's annual convention. More ideas had been submitted in the contest than in any previous year. The high quality of this material attested to the time which had been taken by the contestants in inventing devices and preparing descriptive matter for consideration by the judges. Furthermore, the kinks session was better attended than heretofore.

A review of the operating ideas entered in the contest shows that as a whole the material was characterized by two aspects which had not been apparent before. In the first place there were more ideas than usual regarding improvements in engines, particularly governors. In the second place, considerable attention had been given to the opportunity existing at gasoline plants for utilizing available materials for air conditioning. A number of the prize winning kinks appear here. In early issues the balance of the winners and a number of the kinks receiving honorable mention will be published.

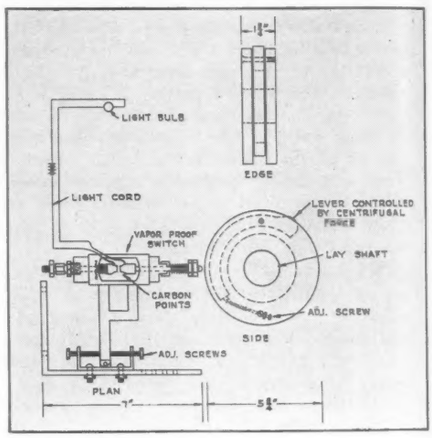
The chief benefit coming from a discussion of operating ideas is not derived from learning about the new devices themselves, but as F. E. Fisher, chairman of the judging committee, pointed out, of most importance is the stimulation which comes from grasping the underlying principles involved which may be applied to the solution of a variety of problems. Prizes were awarded by the association according to classification for different phases of plant operation such as engines, circulation and controls, and miscellaneous operations connected with field gathering lines, laboratory work, etc.

Gas Engine Speed Indictor

FIRST PRIZE, CLASS A, $15.00

GRAYDON GOWER, chief engineer,
C. F. TURBEVILLE, repairman,
Phillips Petroleum Co., Oklahoma City, Okla.

An accurate and positive underspeed indicator has been devised to facilitate the maintenance of the rated horsepower required for the desired gas delivery of a unit. Such a device would be especially useful in a plant having varying loads. This underspeed indicator functions by causing a light to flash by means of a device utilizing centrifugal force. A wheel, fitted to the lay shaft, is equipped with a lever which hugs a grooved wheel when the engine is operating at the prescribed speed. But when the engine slows down, the short end of the lever attachment emerges from the grooved wheel and contacts the point extension of a vapor-proof switch. When points in the switch contact (each time the lever swings out), the light is illuminated and flickers.



The vapor-proof switch is constructed from a sight feed lubricator part; it has very sensitive carbon points. Fabrication of the stand for the switch is such that adjustment by setscrews is possible. Spring tension on the lever can also be varied by an adjusting screw. The value of this device is readily seen by analyzing a situation which is commonly found. Where an average of 200 r.p.m. is desired but where the speed drops to 190 r.p.m. the compressor will pass about 5 per cent less gas. If such a drop occurs in an engine room with more than 20 engines of 230 hp. of this type, one potential engine of 230 hp. is lost in so far as effective gas delivery is concerned. It is difficult to tell when an engine loses a few revolutions by just looking at it. This device can be modified to serve as a combination underspeed and overspeed indicator. To do this, it is only necessary to make a contact protuberance on the opposite end of the lever wheel. Advantages of speed control justify installation of this device.

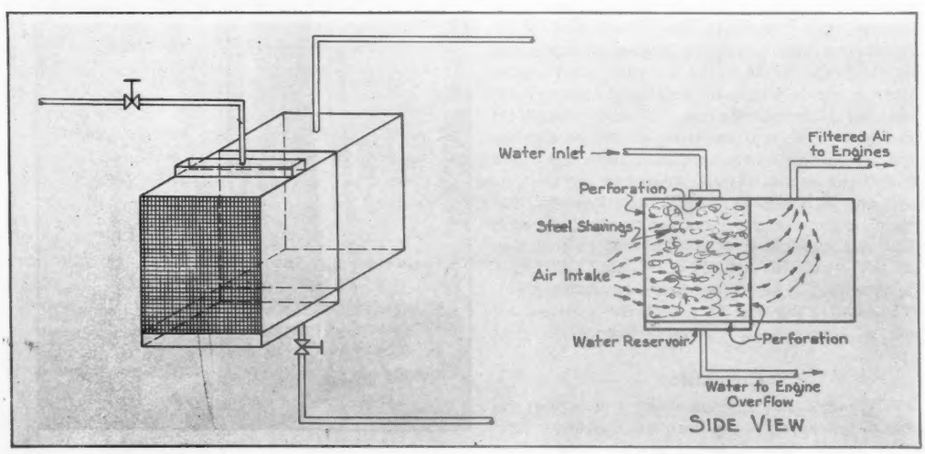
Engine Air Filter and Humidifier

GRAND PRIZE, $25.00

D. B. YOUNG, superintendent, J. E. Crosbie, Inc., Fittstown, Okla.

Air filtering has become a matter of growing importance in areas where dust storms have been increasing in recent years. In making this filter care has been taken to use a box that is large enough to handle the air required by the engine. This box has two compartments: one is the absorbing or filtering chamber which is packed loosely with shavings, over which water pours; the other serves as a scrubber or settling chamber.

While a water filter is not as efficient as an oil filter, one constructed in this way has advantages in a gasoline plant because of its low cost, and because of the humidifying effect produced. It is easily constructed at the plant. Water can be supplied by the engine jacket water system. It has been found that the greatest benefit from this equipment is derived through increasing the horsepower of the engine as a result of increasing the humidity. The same results are obtained as are to be had where water injection is used, except that none of the operating problems are encountered which come with water injection.



Winning Meeting

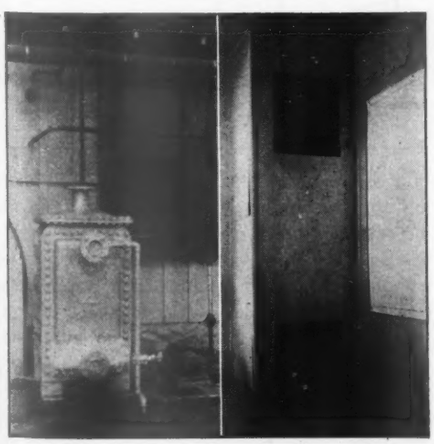
Air Conditioning Unit

FIRST PRIZE, CLASS D, $15.00

G. D. TIDWELL, plant clerk,
Skelly Oil Co., Lyman, Okla.

By using available discarded material it was possible to construct an air conditioning system utilizing butane expansion, which after some preliminary experimenting, proved to be successful enough through hot summer months to demonstrate that it was safe and economical and worthy of being recommended for adoption at any gasoline plant office or laboratory. This air conditioner is operated in a frame flat wall office, exposed to the sun on three sides. The room measures 12 by 24 by 8 feet and there are two doors and six windows. In a test it was possible to get a minimum room temperature of 75° F. when there was an outside temperature of 105° F. During the summer of 1937, the usual practice was to maintain a constant room temperature of 85 degrees without excessive humidity.

The apparatus is simple, consisting of a small heat exchanger and motor-driven circulating pump, placed outside the building, and a radiator and a fan placed inside. An alcohol-water solution is circulated in a continuous cycle from the heat exchanger through the radiator and back again. Liquid butane from storage is expanded through the exchanger tubes to cool the alcohol-water solution. After the gas has passed over the



tubes it goes to the plant through the intake lines, thus making the operation cost negligible.

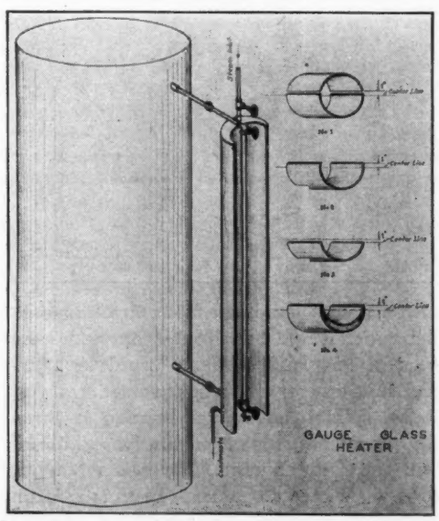
Any size or type of discarded heat exchanger is suitable as there is no pressure to be held. The top of the exchanger is left open for venting. An obsolete Buick pump was picked up, also a second-hand one-quarter horsepower motor and an old style radiator. A cabinet was installed inside the office to house the radiator and fan. Louvres were built in the cabinet to provide for the circulation of air. The entire system is simply controlled by a quarter-inch oxygen needle valve, set for the desired temperature. It has been a practice to set the valve at the beginning of the day and have it continue at the same position without further attention. Such a conditioner would prove to be valuable in a laboratory since it would make it possible to close windows and doors and keep out drafts and other disturbances likely to interfere with distillations and weighing operations. A constant room temperature could be maintained during distillations.

Gauge Glass Heater

FIRST PRIZE, CLASS B, $15.00

F. PILAND,
Shell Petroleum Corp., Skellytown, Tex.

The gauge glass heater allows the glass to be kept hot enough to prevent a false level occurring as the result of congealing of fluids. It is made of pipe of length and size suitable for the position and condition of the gauge glass. In most places, 4-inch or 5-inch is found to be most satisfactory. When parted the two pieces form separate troughs,



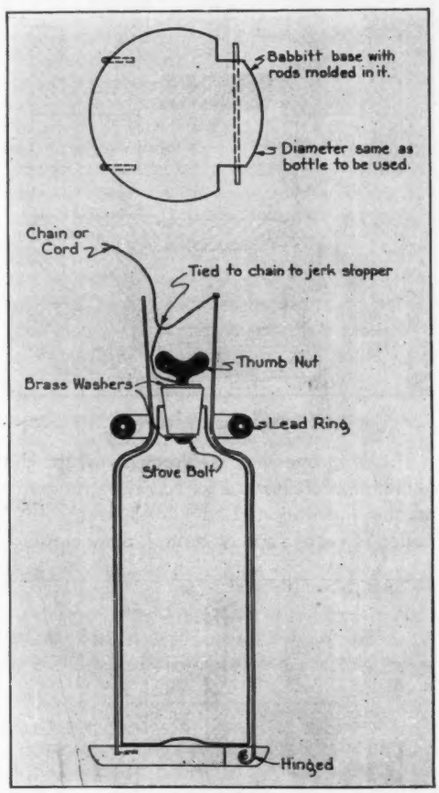
one being 1 inch deeper than the other, as indicated by Nos. 2 and 3. No. 3 is placed in No. 2 with open sides up forming No. 4 which is welded around leaving a space similar to that of a crescent, about one-half inch wide at its widest point. Suitable connections are welded in one side at the bottom for drainage of condensate. Heating can be done with either exhaust or live steam. If live steam is used, the outside should be insulated and a steam trap installed on the condensate line. The heater serves as a windbreak in addition to furnishing heat for the gauge glass and bottom cock and it does this in such a way that the glass is unobstructed. An accurate reading is assured; congealing of oil is prevented; hazards created by the use of a steam hose or hot water are avoided as well as the incidental accumulation of ice on the ground; furthermore, need of tin windbreaks is eliminated.

Gasoline Sampling Device

SECOND PRIZE, CLASS B, $10.00

HERBERT C. HUNTER, plant chemist,
Skelly Oil Co., Lyman, Okla.

This compact, safe device has been made to simplify the problem of getting samples



at different levels in storage tanks or tankcars where the immersion system is necessary. Developed originally for use in large tanks, it later proved to be superior to anything used for sampling tankcars. A sample bottle is easily inserted in the device and when it is lowered to the desired level a jerk on the line pulls the cork and the bottle fills rapidly; after being retrieved, another bottle is inserted and the process is repeated.

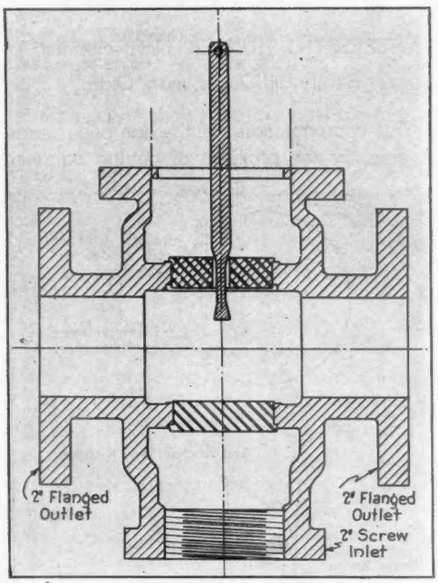
Construction is simple and inexpensive. Two lengths of welding rod are bent to the general outline of the bottle and at the bottom are attached to a base of babbitt. One side is hinged in such a manner as to allow it to swing outward and receive the bottle. A lead ring or washer is fitted over the top of the bottle and rods serve as a lock and provide additional weight. A cork and line complete the material list. With this device, samples are easily and quickly

taken. Furthermore, the neck of the bottle is not subject to damage from contact with the rim of the dome or thief hole.

Improvement on Governor Valve

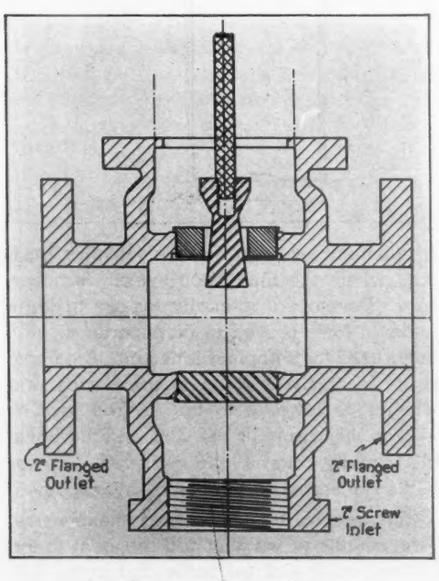
THIRD PRIZE, CLASS A, $3.00

J. G. WILLIAMS, chief engineer,
Phillips Petroleum Co., Oklahoma City, Okla.



High-pressure valve

This improvement is directed toward the elimination of chances for having a runaway engine, prevention of backfiring, and maintenance of perfect safety control, easy starting,



Low-pressure valve

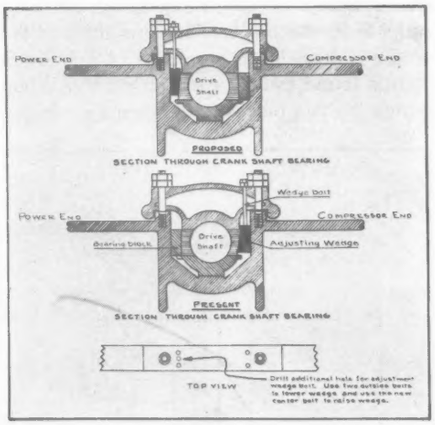
and automatic engine shutdown in case of governor failure. The improved valve acts as a gas control, moving up or down, while the old valve moved downward only. The new valve has friction only in the packing nut, while the old valve had friction in the top and bottom seat and packing nut; this gives greater sensitiveness to the new valve. A bottom plug, attached to the stem, floats in the opening of the governor body, causing the fuel to travel to the valve seat, thus letting the valve float at all times without friction. If something happens to the governor which causes the shaft, or valve stem, to rise, the bottom valve will close off or nearly close off the gas and shut down the engine. The advantage of this feature is obvious for with the standard governor without the bottom attachment or seat, at a time of governor failure, the engine would run away when the valve shaft rises. The ranger wheel makes it possible to set the valve in any desired position while starting the engine. The estimated cost of material and labor (shop) on the new valve and seats is $1.50 per unit.

Improvement on Horizontal Engine

SECOND PRIZE, CLASS A, $10.00

C. C. GIBSON, gas tester,
M. C. BLAIR, boiler fireman,
Phillips Petroleum Co., Oklahoma City, Okla.

To provide for easier and better adjustment of bearings and better alignment of crankshaft, and less cracking of babbitt, an



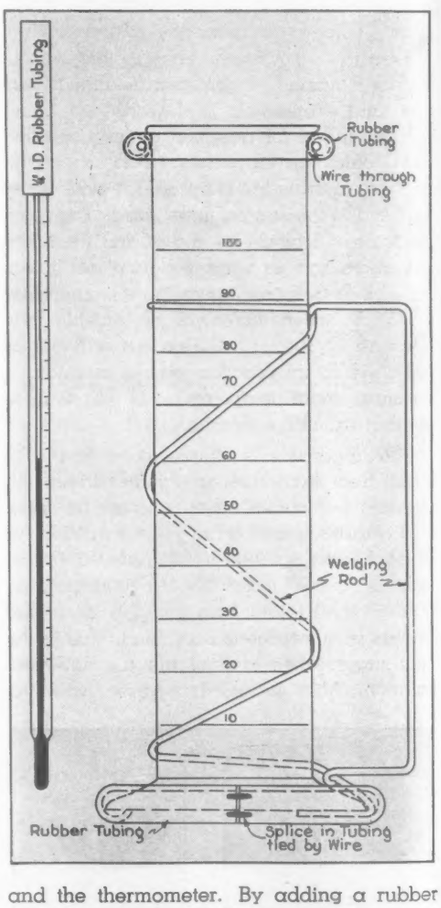
improvement has been made in Clark main bearings. It had been found that with bearings of this kind, in their usual form, the lock nuts on the wedge bolts sometimes work loose. When the wedge bearing is loose, the power thrust against this loose bearing will crack the babbitt. The accompanying drawing shows the present bearing and the proposed change. To effect the change, move the present straight side bearing from the power end side to the compressor end side; change the wedge quarter bearing on the compressor end to the power end side, reversing it so that it will be top side down, in relation to its original position. The wedge block is, likewise, top side down. Three adjusting screws are used: one to pull the wedge up for loosening; two for pushing the wedge down for tightening. The cost of this change is very small. Assurance is given of easier fitting bearings, less adjustment trouble after the bearings are in operation.

Graduate, Thermometer Protector

THIRD PRIZE, CLASS B, $3.00

H. C. HUNTER, plant chemist,
Skelly Oil Co., Lyman, Okla.

A saving of from $10 to $20 per year in glassware expense has been effected where this protector has been used for handling propane samples; and furthermore, the protector safeguards operators against the danger of blistering their hands. In weathering the overhead product, for tower control, this apparatus has been used for quite a while by the inventor. The handle on the graduate makes it possible to obtain samples with little danger of the product boiling over suddenly, burning the hands and causing the operator to drop and break both the graduate



and the thermometer. By adding a rubber tubing protector at both top and bottom of the graduate, and by putting a short length of tubing on the end of the thermometer the apparatus, barring accidental dropping, is almost unbreakable. When not in use, it may be hung on a hook or convenient valve wheel close to the sample supply.

In laboratory bench work, by using only the top protector, the graduate seldom suffers from being bumped or tipped over and yet the view of the graduate is not obstructed. The only materials needed are rubber tubing and welding rod or suitable wire. Results are well worth the effort entailed in making this device.

PROBLEMS FROM READERS

Edited by L. G. E. Bignell

Water-Flooding

The practice of permitting water to escape from one formation to another in oil wells was carried on early in the life of the industry, sometimes because of poor casing jobs and at other times deliberately because it had been observed that adjacent wells were benefited by the movement of the water through the oil sand. This practice of water-flooding of oil sands was not legalized in Pennsylvania until 1920, although production men had long recognized the advantages to be gained by controlled flooding and had developed, to some degree, the technique of this method of increasing recovery of oil from partially depleted sands.

Producers during the early days of the industry did not recognize the value of the natural gas energy stored in the reservoir along with the oil, and it was very common practice "to blow the well into oil." This meant the well was allowed to produce practically unrestricted until the natural gas accompanying the crude oil had been reduced to a very minor volume and the wells were practically ready to go on the pump. It was believed that when the pumping stage was reached the well would produce almost indefinitely, and the assumption was not far from correct, because in many of the older fields some of the wells still produce but the volume of oil now being secured per day is so small as to make the wells yield very small profits. The net effect of "blowing the wells into oil" was to dissipate the natural gas energy, and in many fields there was little or no accompanying edge or bottom water to aid in flushing the oil from the sand pores, so during the later life of the wells the oil escaped into the wells largely through the force of gravity set up by the difference in fluid head between the oil in place in the saturated sand and the well bore.

When it was discovered that fresh or salt water permitted to escape into the oil sands tended to drive the oil ahead of the water toward the well and in this manner increase the rate as well as the volume of oil recovered the practice became more or less general in the Bradford field in Pennsylvania and in other fields where like conditions prevailed. While the first flooding had been following a rather haphazard system it soon became apparent that something more than just permitting water to enter the oil sands promiscously was necessary. Later records showed that uncontrolled water-floods did about as much harm as good because in many instances it surrounded bodies of crude oil in the formation and cut it off from exit to the well, or it created an emulsion in the formation which was practically impossible to recover.

The main factors to be considered in flooding an oil-bearing formation have been summarized as follows by J. F. Carrl, in Second Geological Survey of Pennsylvania, Volume 3, "The Geology of the Oil Regions of Warren, Venango, Clarion and Butler Counties."

Time of flooding—either early in the life of the property while a large percentage of oil and gas remains in the formations, now known as "pressure maintenance," or late in the life of the field when natural energy has been depleted and the oil is flowing to the wells by gravity only.

Composition and thickness of the formation (whether loose or consolidated), whether regular and homogeneous throughout or composed of fine sand interbedded with irregular layers of gravel, in places laying near the top and in places near the bottom of the strata.

Position in the pool—whether flat, as on a structural terrace, upon a monoclinal slope, upon the crest of an anticline, or at the bottom of a syncline, also consider the angle of dip of the formation.

Shape and size of the area to be flooded.

Position and number of inlet wells with reference to the location of surrounding wells from which the oil is to be recovered.

Hydrostatic pressure to be developed by the column of water in the input wells.

Duration of the water supply. Ample Supply of flood water is very essential and the character of this water is also very important because if it has to be treated before it can be used it will add materially to the cost of recovering the oil.

Laboratory study of samples and cores of the producing formation in a modern laboratory especially equipped for this class of work. Report upon characteristics of the producing formation, porosity, permeability, saturation and probable recovery are essential.

Following the successful application of water-flooding to the Bradford field in Pennsylvania operators with properties in the Bartlesville sand in southeastern Kansas and northeastern Oklahoma started flooding operations in 1933.

Recent Development in Water-Flooding

"The principles of water-flooding oil sands are as old as the production of petroleum, but carefully controlled pattern pressure flooding is of comparatively recent origin." This is the opening statement of a paper by A. C. Simmons bearing the above title and presented before the annual meeting of the eastern district of the A.P.I. Division of Production at Pittsburgh, Pa., in April. This paper is a presentation of a water-flooding project, including cost of development, a discussion and description of the mechanical equipment, the application of water, and oil production results. Data are included to indicate the similarity of Bradford field five-spot decline curves and the desirability of maintaining high water pressures, high rates of water input, and illustrate the advantages derived from various innovations of automatic equipment and mechanical protective devices.

The project described in this paper included a rectangular area of 30 acres with a north-south dimension of 1,320 feet and an east-west dimension of 990 feet. This tract is admirably suited to a five-spot pattern with a water well spacing of 330 feet from well to well and includes 12 five spot wells or squares of 2½ acres each.

Completion costs of oil and water wells are similar for drilling, shooting and casing costs are identical, although in practice a water intake well will cost only about 90 per cent of the cost of an oil well, due to the fact that a water intake well is tubed with 1½-inch tubing, whereas the oil wells are tubed with 2-inch tubing, and it is not necessary to install any pumping equipment in a water intake well.

There was an average cost of $2,500 per well for the entire 32 wells, and total drilling and equipment costs on the 30-acre project were approximately $120,000 or $4,000 per acre. This development cost is about an average for the Bradford field, but several major units are applicable to and will serve additional developments. Average development costs in the Bradford field will vary between $2,800 and $3,500 per acre.

The supply of water needed for flooding is secured from a well 300 feet deep with an 8-inch drive pipe extending 140 feet to bed rock, as early attempts at developing a suitable water supply in the sandy, clayey gravels appeared doomed to failure. No well defined water-bearing sandstone occurs in this area and rock wells obtain their water from fractured zones and crevices. When it was completed as a rock well, the supply was wholly unsatisfactory due to its low yield of 30 gallons per minute. The most favorable appearing streaks of gravel were penetrated with a pipe perforator in the 8-inch drive pipe. The first opening (65-70 feet) gas materially increased yield but the water quality was unsatisfactory. An additional perforation (75-80 feet) again increased the yield but the quality was equally bad. The next most favorable gravel zone occurred in this well at 115 to 120 feet, and later this section of pipe was perforated. The upper perforations were shut off with a hook wall packer on 6⅝-inch casing and the zone from 115 to 120 feet developed into a thoroughly adequate and suitable supply.

High pressures are desirable in the extraction of oil by water-flooding due primarily to the fact that each sand permeability has a definite admittance or threshold pressure and the use of higher pressures will admit water to stratas of lower permeability. Due to depth and rock formations overlying an oil sand there is, for each property or flood project, a definite critical pressure. Applied pressures in excess of the critical will cause heaving or fracturing of the formation with direct water by-passing between water well and oil well. In the Bradford field it appears that the critical or maximum safe pressure is 1.5 to 1.75 pounds per foot of depth.

The following conclusions have been drawn from the facts presented in Mr. Simmons' paper.

Systematic patterned water-flooding using artificial pressure represents an expensive re-development of an otherwise depleted oil field, but with satisfactory sand and reservoir conditions it is an efficient method of recovering a large percentage of the residual oil.

A complete and thoroughly adequate water supply system both with respect to quantity and quality is an important necessity.

Initial rates of water input can be maintained with the use of increased pressures and water of good quality.

The use of high pressures will result in greater peak production on individual five-spot wells and with a similar percentage decline there will be obtained a greater recovery per acre.

Production data for different flood areas becomes comparable when calculated on a per acre basis, which permits an easier and more simple appraisal of the productiveness of any specific area.

Properties in the Bradford and Allegany fields are purchased on a per acre price basis and ultimate costs are estimated and computed on a per acre basis, and to obtain a true basis of comparison of different flood developments it is necessary to reduce the cumulative production or rate of production to a per acre unit.

QUESTIONS ON TECHNOLOGY

By Charles K. Francis, Ph. D., Technical Editor

Crude Oil From Miocene Wells in Manvel Pool, Texas

Will you furnish the information showing analysis of what is known as Manvel crude oil from the Miocene formation?—F. H. A.

The Manvel pool is located in the northern part of Brazoria County, Texas. The Miocene wells produce an oil, from the formation at 3,800 to 4,000 feet, which has the properties described as follows:

MIOCENE OIL, MANVEL POOL, TEXAS

Properties of the Crude Oil

Gravity, A.P.I.	24.8
Flash, °F.	205
Viscosity @ 100° F.	113
Pour, °F.	0
Sulfur, per cent	0.24
Initial boiling point, °F.	396
Tar, per cent	10.0

Yield on Fire and Steam Distillation

		Per cent
Gas oil		45.0
Gravity	29.4	
Flash, °F.	146	
I.B.P.	389	
Maximum	700	
Neutral lube oil		15.0
Gravity	24.7	
Flash, °F.	335	
Viscosity @ 100° F.	110	
Lube stock		30.0
Gravity	19.8	
Flash, °F.	440	
Viscosity at 100° F.	1,450	
Pour, °F.	0	
Fuel oil		8.0
Vis. Furol @ 210° F.	255	
Pour, °F.	0	

The Manvel pool produces approximately 300,000 bbls. per month from 105 flowing and 58 producing wells. (March 1937.)

Separation of Water From Alcohol and Gasoline Mixtures

What quantity of water when added to a mixture of alcohol and gasoline will cause the two liquids to separate?—D. C. A.

There are several alcohols that have been proposed for mixing with gasoline to be consumed as motor fuel. The best known is ethyl alcohol; the others are methyl alcohol and propyl alcohol.

Ethyl alcohol will retain only approximately 0.1 per cent water in a 5 per cent mixture at 32° F. and up to 1.7 to 2.1 in a 25 per cent mixture at 60° F. The difference, apparently, is due to the type of gasoline. Methyl alcohol has a lower water tolerance. Propyl alcohol appears to have a higher water tolerance in mixtures with gasoline than ethyl alcohol. At 68° F. a 5 per cent propyl alcohol has a tolerance for 0.16 per cent water; a 10 per cent mixture, 0.46 per cent; a 15 per cent mixture, 0.84 per cent, and a 25 per cent mixture, 2.2 per cent, all at 68° F.

The data are from the paper by Elizabeth W. Aldrich, who makes this conclusion:

"The present work shows that, at all temperatures of practical interest, the water tolerances of mixtures of gasoline with n-propyl alcohol are greater than those of mixtures of gasoline with ethyl alcohol containing the same percentage of alcohol. However, when the mixture contains n-propyl alcohol, if separation occurs below approximately —15° C. the second phase will be solid, or if separation occurs above this temperature, the liquid which separates will free if lowered to this temperature. Although the greater water tolerances of mixtures of gasoline with n-propyl alcohol give them an advantage over mixtures with ethyl alcohol if used as motor fuels, consideration must be given to the possible disadvantage of the formation of solid material, which does not occur in mixtures with ethyl alcohol."

Refrence: Elizabeth W. Aldrich, Critical Solution Temperatures of Gasoline, n-Propyl, and Water. National Bureau of Standards, R.P. 1060, 1938.

Increasing Aromatics for Raising Octane Value

Some crude oils contain small percentages of aromatics. Is there any refining process arranged for obtaining these in the gasoline fraction to give increased octane number?—S. S. N.

The cracking operation, polymerization, and special care in treating are recognized methods for adding to and concentrating in the motor fuel fractions the compounds, especially aromatics, which have value as antiknock substances. A recent British patent refers to the treatment of naphthenic fractions in a catalytic process and then extracting the aromatic compounds with a solvent, such as used for making lubricating oils.

An example is mentioned. A gasoline, from Sumatra crude oil, is vaporized, then contacted with a tungsten catalyst at 932° F. in an atmosphere of hydrogen at about 725 pounds pressure. The normal 25 per cent aromatic content is increased to 43 per cent. These are extracted with two volumes of liquid sulfur dioxide at 5° F. After separation from the solvent, the extract contains 71.5 per cent aromatic compounds.

Reference: British Patent 474567, March 30, 1936. Naambouze Vennootschap de Bataafsche Petroleum Maatschappij.

Table of Percentages and Chart for Blending Natural Gasoline

In your article, "Blending Natural Gasoline for Making Motor Fuel." The Oil and Gas Journal, April 7, you refer to a table of percentages but did not present the table. Will you kindly supply this additional information on the subject?—N. G. P.

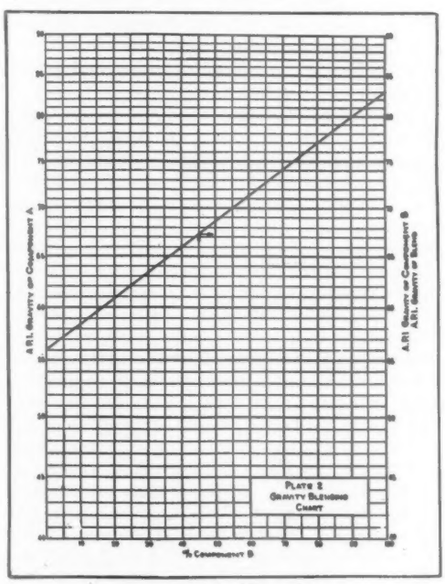
The data in the table of the reference are based per cent evaporated at 212° F., the index of useful volatility.

"Suppose a refinery stock has been selected, which has 20 per cent evaporated at 212° F. (A.S.T.M. distillation) and it is desired to make a finished product having 50 per cent evaporated at 212° F. Reading across on the 50 per cent line and down in the 20 per cent column it is seen that 42.7 per cent natural gasoline must be used."

MINIMUM PER CENT OF NATURAL GASOLINE TO USE IN BLENDING FOR DEFINITE SPECIFICATIONS FOR A.S.T.M. PER CENT EVAPORATED AT 212° F. OF FINISHED BLEND

Per cent evap. at 212° F.	A.S.T.M. per cent evaporation at 212° F. refinery stock—									
Finished blend	0*	5	10	15	20	25	30	35	40	45
40	44.4	41.2	37.6	33.6	29.0	23.7	17.2	9.5	0.0	0.0
45	50.0	46.6	43.4	39.8	35.6	30.7	24.7	17.9	10.0	0.0
50	55.6	52.1	49.5	46.3	42.7	38.4	33.1	27.0	20.0	12.0
55	61.1	57.9	55.3	52.6	49.5	45.9	41.3	36.1	30.0	22.5
60	66.7	63.0	61.0	58.9	56.3	53.1	49.6	45.1	40.0	33.0

*I.B.P. not higher than 250° F.



Gravity blending chart

While gravity alone is but little indication of quality, it is of considerable importance for plant control and blending purposes.

The illustration indicates the per cent, 45, at the bottom, of 83 gravity gasoline, shown at the right, required to blend with a 56-gravity product, at the left, to produce a blend of 67.3 gravity, obtained from the line reading from either side.

Reference: Natural Gasser, October, 1934.

CHEMICALS FOR THE PETROLEUM INDUSTRY

Nitrogen

Use—Inert atmosphere for instruments and electrical switches.

Form—Colorless, odorless, tasteless, noncombustible gas.

Symbol—N.

Specific gravity—0.96737.

Melting point— —346° F.

Boiling point— —320° F.

LIMITATIONS

Technical Grade

Specific gravity—0.96.

Acid—None.

Purity—99 per cent.

FIELD OPERATIONS

Summarizing the Week's Developments

OKLAHOMA—Four wildcats were showing oil and gas sufficiently to indicate the opening of as many pools. One was in section 12-7-2w, Cleveland County; one in section 27-16-1e, Logan County; one in section 12-17-1e, 5 miles south of the Ramsey pool, in Payne County; and the other was in section 6-18-5, north of Cushing in eastern Payne County. The Cleveland County test flowed 85 bbls. of oil per hour and 16 bbls. of water through tubing for 22 hours, and the test in section 12-16-1e, flowed 525 bbls. of oil in 13 hours.

KANSAS—Wildcatters had a field-day in Kansas, discovery wells being completed or near completion in section 3-22-12w, Stafford County; section 10-17-12w, Barton County; section 12-11-18w, Ellis County; section 31-21-12w, Stafford County, and section 19-15-15w, Russell County. The Arbuckle lime zone of the Stumps pool, Rice County, was extended nearly 1 mile westward.

TEXAS—In Southwest Texas a test in Redfish Bay off Aransas County and an outpost 5 miles from the new South Alice pool in Jim Wells County, were showing oil, and a prospective oil well was testing in the White Point gas field in San Patricio County. Duval and Starr County wildcats are also showing encouragingly. In the Texas Coastal region a test on the Galveston County coast line was blowing gas and mud in large volume and looked like a pool opener. Cedar Point field in Galveston Bay was extended 1,800 feet and the Seabreeze field in Chambers was extended southerly. New sands in several Coastal Louisiana pools were indicated. The deepest test east of California, in section 77-19s-17e, was drilling at 12,606 feet. Pools were opened in Cochran and Crane counties, West Texas, and in Haskell and Callahan counties in Central Texas. Probability of a second Ordovician lime pool in Archer County seemed good as Humble Oil & Refining Co. cored saturated lime at 5,019-5,115 feet. The first Ellenburger discovery well, Blackwell Oil & Gas Co. No. 2 Wilson, flowed 50 bbls. per hour. Wilbarger and Cooke counties both were favored with pool discoveries. The Flag Lake pool in Henderson County appears to have an extension well in Texas Co. No. 1 Adamson.

TEX-LA-ARK AREA—A new and deep producing area was proven in the Blue Lake field of Sabine Parish, Louisiana. The well flowed 43 bbls. an hour through fractional inch chokes.

KENTUCKY—Three additional McClosky lime producing wells are in Henderson County, but not yet completed. None of the three is as large a producer as the Hoosier Drilling Co.'s discovery well.

WYOMING—The discovery well on the Cole Creek structure in Natrona County flowed 57 bbls. per hour on a drill stem test from Lakota sand. The well will soon be ready for a real production test.

CALIFORNIA—The San Joaquin Basin in California is promised three and possibly four new pools if present performance is a criterion. Standard, Continental, Petroleum Securities and Ohio companies are responsible for one each of these tests.

Completions in All Fields

(Week Ending May 21, 1938)

	Oil	Gas	Dry	Total	1938 total comp. to date	1937 total comp. to date
N. Y., Pa. and W. Va.	46	8	9	63	1,664	1,501
Ohio	4	6	2	12	337	373
Indiana	0	0	0	0	37	40
Kentucky	7	2	6	15	299	124
Illinois	24	0	1	25	366	25
Michigan	6	0	7	13	296	333
Kansas	30	1	14	45	687	875
Oklahoma	18	0	9	27	673	1,082
Texas:						
North Central Texas	57	0	25	82	1,204	1,055
West Texas	48	0	3	51	915	995
Texas Panhandle	12	3	0	15	247	257
East Texas	39	0	0	39	901	818
East Central Texas	3	2	3	8	140	253
East Texas Border	1	0	0	1	66	163
Gulf Coast Texas	22	1	4	27	484	532
Southwest Texas	10	0	5	15	821	1,287
Total Texas	192	6	40	238	4,778	5,360
North Louisiana	13	1	0	14	220	246
Gulf Coast Louisiana	3	0	5	8	187	190
Total Louisiana	16	1	5	22	407	436
Arkansas	5	0	2	7	95	51
Montana	1	0	1	2	26	53
Wyoming	3	0	0	3	63	37
Colorado	0	0	0	0	3	6
New Mexico	13	0	2	15	230	296
Utah	0	0	0	0	0	0
California	25	0	4	29	531	558
Total United States	390	24	102	516	10,492	11,150
Total previous week	415	41	93	549		
Difference	25	17	9	33		

Outstanding Fields--Highlights

(Week Ending May 21, 1938)

FIELD—	Rigs up	Wells drlg.	Weekly oil completions	Initial prod.	Total No. oil wells	Daily av. prod.
TEXAS						
K.M.A.	23	164	26	19,414	421	17,398
Ector County	18	90	21	18,400	1,047	31,550
Winkler County	7	20	4	1,210	1,634	34,398
Hastings	4	9	2	1,101	531	18,312
Saxet	4	8	1	61	555	32,425
West Saxet	3	7	0	0	18	18,210
Benavides	4	7	0	0	185	9,227
East Texas	39	114	39	2,149	25,133	362,248
Talco	4	6	0	0	631	24,000
OKLAHOMA						
Dora	2	8	2	1,300	62	5,325
Oklahoma City	5	12	1	852	1,078	103,200
KANSAS						
Barton County	4	21	6	6,202	316	10,075
Ellis County	3	14	2	3,847	320	9,755
Rice County	3	24	2	1,313	1,154	29,604
Russell County	7	26	3	5,546	1,073	22,014
NEW MEXICO						
Lea County	12	92	8	4,116	1,725	85,620
LA-ARK-TEX						
Rodessa, Tex-La-Ark	2	22	4	1,645	976	82,670
Cotton Valley, La. (Deep)	3	25	0	0	53	12,470
Lisbon, La.	6	11	8	7,380	214	7,175
Schuler, Ark.	2	19	1	840	49	8,670
MICHIGAN						
Buckeye	3	19	0	0	402	25,682
ILLINOIS						
Central Illinois	39	168	24	6,097	521	33,546
CALIFORNIA						
Wilmington	12	31	7	9,852	471	102,250

Eastern Field Report

By STAFF CORRESPONDENT

Increase in Operations, But Completions Are Featureless

PITTSBURGH, Pa., May 23.—Operations increased slightly during the past week in the lower eastern fields both in completions and new work under way. The completions were without a feature and consisted of a total of 22 which included eight dry holes, seven gas wells, and seven producers with a daily initial of 52 bbls.

SOUTHEAST OHIO

In southeast Ohio, four wells were completed. In Athens County, A. D. Townsend completed a No. 3 on the Jacob Niggemeyer farm near Shade in section 11, Lodi Township, in the second Berea sand at 1,720 feet. It is a gas well gauging 300,000 feet a day.

In Licking County, Eugene Ridgeway completed a 5-bbl. well on the C. R. Richards farm in section 13, Mary Ann Township, in Berea sand at 790 feet. It had been shot.

In Perry County, Ira Coffman completed a second test on the B. B. Marshall farm in section 33, Monroe Township, in the Berea sand at 1,115 feet. It produced 2 bbls. the first day after shot. In section 2, Monroe Township, Bag Run Oil & Gas Co. completed a second test on the C. L. Weaver heirs farm in the Berea sand at 1,071 feet and it produced 1½ bbls. the first day after shot.

In Coshocton County, the Wittmer Oil & Gas Properties reached 3,770 feet in the deep test on the S. P. Balder farm, Lot 30, northeast quarter of Crawford Township, and was delayed with a fishing job. The tools have been recovered and drilling resumed.

In Trumbull County, Norwood P. Johnston and others reached 3,791 feet in the deep test on the G. M. Porter farm west of the crossroads at Mecca in Mecca Township and lost the bit at that depth, and are fishing.

SOUTHWEST PENNSYLVANIA

In South Franklin Township, Washington County, Pennsylvania, F. K. Fawcett and others completed a second test on the Jacob Buchanan farm in Little Dunkard sand at 886-981 feet. It is good for 10 bbls. a day initially.

In Smith Township, Washington County, A. B. Coleman and others completed a test on the Pittsburgh Coal Co. lease in the Salt sand topped at 996 feet. It gauged 1,470,000 feet of gas per day with a rock pressure of 168 pounds. Total depth was 1,010 feet.

In Greene County, Equitable Gas Co. deepened No. 405 on the John Morris farm in Whiteley Township to 3,068 feet. The Bayard Stray sand was at 3,055-66 feet with 250,000 feet of gas at 3,056-59 feet.

In Washington Township, Greene County, Peoples Natural Gas Co. deepened No. 3508 Eva M. Simmons to 3,452 feet. Bayard sand was at 3,386 feet with 48,000 feet of gas showing at 3,388 feet. In this township, the Carnegie Natural Gas Co. had reached 1,712 feet, deepening No. 2 Sadie A. Connor.

In Greene Township, Greene County, Equitable Gas Co. is moving in a machine to deepen No. 446 S. G. Durr starting at 2,116 feet. In Jackson County, this company is cementing cave at 2,295 feet, deepening the C. S. Orndoff No. 2788. In Center Township, this company is drilling at 2,524 feet, deepening the C. J. Conklin No. 2,681, and at 2,346 feet deepening No. 246 Jess Lapping in Franklin Township.

In Whiteley Township, Greene County, Carnegie Natural Gas Co. is setting a machine to deepen No. 2 J. C. Morris. In Center Township, the Union Gasoline & Oil Corp. is down 250 feet in No. 2 Mabel Bodley. In Monongahela Township, Fred Garrison is drilling at 2,345 feet in No. 1 Stoneking.

Near Mount Morris, Gartland Oil Co. has run casing to 1,967 feet on the J. L. Donley farm.

Washington County

In Hanover Township, Washington County, K. Aten and others are rigging up on the Lee Devill farm. In Donegal Township, Heidlemeir and others are down 974 feet in the J. M. McMurray test. In South Strabane Township, Penn Oil & Gas Co. is rigging up on the W. E. Davis farm.

In Peters Township, Carnegie Natural Gas Co. is deepening on the Guthrie farm. In North Strabane Township, Beedle & Debone are drilling at 1,975 feet on the John Arblaster farm. In Amwell Township, Union Gasoline & Oil Corp. has started drilling the No. 2 Leroy Vankirk. In Morris Township, this company is down 1,950 feet in No. 4 Craft.

Deep Tests

In Westmoreland County, the Peoples Natural Gas Co. has reached 5,850 feet in the rotary test on the John S. Marshall farm on the Grapeville anticline in Penn Township.

In Allegheny County, South Penn Oil Co. and others completed repairs to the rotary equipment in the test on the Fred Backhus farm on the Kellersburg anticline in West Deer Township and started up, but caves prevented the string from reaching bottom. At 3,512 feet, the bottom joint was lost and is being fished.

On Chestnut Ridge in Fayette County, Greensboro Gas Co. has reached 6,040 feet on the J. R. Thompson farm in Wharton Township. Due to a higher surface elevation than the test well on this structure and the subsea dip north, the top of the Onondaga is not expected mch less than 7,000 feet. In North Union Township, Fayette County, on this structure, Wasson & Co. underreamed to 2,370 feet and lost the bit which has been drilled by and is being fished in the test on the J. H. Sorg farm. The casing is expected to be lowered to 2,387 feet. In Springhill Township, on the southern end of this structure, the L. J. Houze Convex Glass Co. is drilling at 2,850 feet on the Paul Dunham farm.

WEST VIRGINIA

In Calhoun County, West Virginia, South Penn Oil Co. completed No. 3 J. S. Sharpes farm in Sherman district in Injun sand at 2,169 feet. It made several flows and is rated good for 20 bbls. a day. In Pleasants County, Ward Deems & Co. completed No. 3 Cassie Dye in Washington district in Big Injun sand at 1,241 feet and it is good for 10 bbls. a day. In Boone County, Pure Oil Co. completed No. 284 on the Federal Coal €o. lease in Sherman district through Berea sand to 3,335 feet and it is good for 8 bbls. a day.

Gas Wells

In Calhoun County, A. R. Stump drilled a second test on the Clayton Stump farm in Sherman district to 1,925 feet when litigation prevented completion. The Big lime was at 1,761-1,800 feet; Big Injun sand 1,800-1,925 feet; show oil 1,920 feet. All material was removed from the lease.

In Clay County, Hope Natural Gas Co. drilled a test on the Thompson Coal Land Co. in Union district through the Injun sand to 1,642 feet and it was dry and is being abandoned.

In Doddridge County, Henderson Oil Co. drilled a test on the Alex Liggett farm in Central district to 2,096 feet and it was dry and will be abandoned. Injun sand was at 2,026-96 feet.

In Gilmer County, the Massey & Jarvis Drilling Co. completed two wells in Glenville district. The test on the John S. Withers heirs lease is a gas well in the Maxton sand gauging 375,000 feet a day at a total depth of 1,282 feet. The test on the James A. Tierney farm is a gas well in the Salt sand gauging 100,000 feet a day at a total depth of 1,238 feet. In DeKalb district, W. H. Mossor test on the P. P. Gragg farm was drilled through the Berea sand to 2,360 feet and was dry.

In Hancock County, the R. J. Braden Co. drilled No. 53 C. E. Brenneman in Grant district to 1,068 feet and it was dry.

In Ritchie County, the McCall Drilling Co. completed the test on the Effie and W. H. Smith farm in Clay district in Injun sand at 2,112 feet. It is a small gas well which may not be operated, gauging 53,000 feet a day 36 hours after the shot. In Union district, H. M. Deem drilled a test on the W. S. Fowler farm through the Squaw sand to 1,965 feet and it was dry and abandoned.

In Wirt County, J. N. Cullum drilled a test on his fee property in Clay district through the Cow Run sand to 486 feet and it was dry and abandoned.

Oriskany Gas Field

No wells were completed in the Oriskany gas pools in Kanawha County but several new locations were made. In Poca district, United Fuel Gas Co. made a location on the J. W. Harding and others farm, elevation 693.9 feet; one on the O. V. Milam farm, elevation 840.4 feet and one on the Flota Johnson farm, elevation 851 feet. In this district, this company is drilling at 4,710 feet in No. 4970 W. H. Sisson; in No. 4787 W. J. Glass and others at 1,584 feet; No. 4793 W. A. Fisher and others at 1,178 feet; rigging up No. 4788 Cavender and building rig for No. 4791 W. J. Glass. The United Carbon Co. is down 1,065 feet on the Louisa E. Long farm and rigging up the I. C. Miller test. Guy B. Ray has reached 1,700 feet in No. 1 Emmett Thaxton farm. Joe Rubin is down 3,200 feet on the Carney heirs farm; Liosag Fuel Co., drilling at 3,650 feet in the H. C. Matthews test; D. H. Stephenson & Co. at 3,520 feet in the Rozella Shamblin and others test; Phillip K. Harness at 500 feet on the Lena Snodgrass land; Spartan Gas Co., started drilling the R. B. and Fred Baldwin test; Poca Fork Oil & Gas Co., building rig for the Levi Combs test; Geary Morley Gas Co., building rig for the Diana J. Milam and others test. The Columbian Carbon Co., drilling at 1,749 feet on the Boyd Castro farm; at 1,360 feet in the Johnson, Gibson and others test, and building road to the L. P. Rollins farm. In Union district, this company is down 4,815 feet on the Nelson H. Cavender land. The West Virginia Gas Corp. is drilling at 2,770 feet on the J. E. Layne and others land.

In Elk district, Columbian Carbon Co. topped Oriskany sand at 4,969 feet on the Margaret Rayhill farm and was 4 feet in. This company is down 2,881 feet in the B. F. Jones test and has rig up for the C. W. Vickers well. Cameron Drilling Co. reached 4,000 feet on the Henry Hansel farm and shut down. In Malden district, North Eight Producing Co. is deepening on the L. E. and R. Belcher farm and has reached 3,940 feet.

Deep Tests

In Jackson County, W. H. Petry abandoned further attempts to recover the tools and line lost in the deep test on the D. O. Curry farm in Ravenswood district which reached the Oriskany sand with a showing of gas. The final depth was 4,716 feet and it was impossible to drill by the tools.

In Ripley district, Jackson County, Potter Development Co. is down 4,150 feet on the William T. Chancey farm. In Washington district, the United Carbon Co. is drilling at 250 feet in No. 3 Elizabeth Ward Perkins.

In Wood County, the Belmont Quadrangle Co. was drilling at 3,450 feet on the C D. White farm in Steel district. In Harris district, Potter Development Co. had reached 3,500 feet in the W. H. Orem test. In Lubeck district, W. H. Bickel is getting ready to deepen on the W. H. Bickel farm.

(Continued on Page 111)

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is the drillers' best friend because it makes the easiest brake known and "feeds off" evenly while drilling. It never scores brake rims. See page 1940, Composite Catalog.
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Is your way out of Rotary Hose grief . . . As proven on deep, High Pressure Drilling the World Over.

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1606 Maury St.,
Houston, Tex.

Among Gulf Coast Drilling Contractors

Trinity Drillers, Inc., of San Antonio, received contracts for additional drilling in the Driscoll and Alta Mesa field in Duval and Brooks counties. No. 24-A Driscoll is being spudded for the Continental Oil Co. at Driscoll, while No. 13 Mestena is being started for Standard Oil Co. of Texas. Reports of a showing of oil in Coastline Oil Co. No. 1 State, in Redfish Bay, about 2 miles off Aransas Pass, has attracted much attention to this operation. The well is bottomed at 7,920 feet and casing is expected to be run. Sand was logged at 7,338-73 feet. Other operations by this company were reported in last week's review.

Glenn H. McCarthy has made location for three wells in the Hardin field, Liberty County, which will be drilled on farmed-out acreage from Shell Petroleum Corp. This contractor has one rotary drilling in Tyler County and one in the Benavides field for himself while in the Katy field, No. 1 Freeman, a scheduled 10,000-foot test, is drilling below 7,800 feet.

O. W. Dyer has moved a rotary to San Patricio County, where No. 1 Jones, several miles northeast of the East White Point field will be drilled for Atlantic Refining Co. Six other operations are listed for the same company in the Hardin, Dickinson and Barbers Hill fields.

Allen & Morris have spudded I. J. Allen No. 1 Rooke, a wildcat in the Woodsboro area, Refugio County; have started drilling operations on Sinclair Prairie Oil Co.'s third well in Laguna Madre, offsetting production at Flour Bluff. An encouraging showing has been logged in Humble Oil & Refining Co. No. 1 Kelsey Bass, Jim Hogg County, which is drilling below 4,300 feet. Other Allen & Morris rotaries are located as follows: One in Willacy County for Continental Oil Co., four in the Luby field for Seaboard Oil Corp. and one in the Chittim field for Wellington Oil Co.

Smith & McDannald have spudded Tide Water Associated Oil Co.'s first test in the Eureka field, Harris County, and are preparing to start another operation in the Port Barre field for the Pan American Production Co. Active operations are reported at Pledger for Danciger Oil & Refining Co. at Hastings for Stanolind Oil & Gas Co., at Long Lake for Tide Water Associated Oil Co., one at Five Corners for themselves, three at Dickinson for Pure Oil Co. and one at Hardin for themselves.

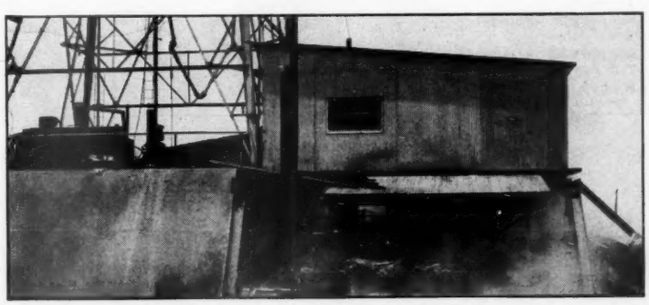
Cron & Gracey continue testing Red Bank Oil Co. No. 1 H. H. Coffield, which has shown for a probable discovery well of a new Edwards lime field in Burleson County. The well is located south of Rockdale, and flowed at the rate of 20 bbls. of oil per hour for several hours. It "went dead," and flow valves are being installed in an attempt to get the well to flow. The hole is bottomed in the Edwards lime at 6,171 feet. Locations of other Cron & Gracey rotaries were reported in a previous review.

Housch & Thompson completed Mortex Oil Co. No. 1 Ley in the Fairbanks field, Harris County, and have moved a rotary to the Windorf lease in the same field which will drill a well for themselves, about a half mile southwest of production.

Jack Frazier is completing his third producer in the Eureka field for himself and has spudded a wildcat in the Deer Park area, Harris County, which is being drilled jointly with C. B. Bunte.

There were 37 new locations reported for the Texas upper Gulf Coast the past week, which is an increase over the previous week. Wildcatting in this district continues to be quiet with practically all of the new work being confined to proven fields.

Northeast of the Gueydan field, Vermilion Parish, Magnolia Petroleum Co. was reaming the hole in No. 1 J. B. Ferguson preparatory to running casing. The hole is bottomed at 7,692 feet and it is probable that it will be deepened, although encouraging showings were logged at 7,061-7,173 feet.



Set up Cron & Gracey large rig on Fohs Oil Co. barge in the Lake Long field, Lafourche Parish, Coastal Louisiana. Picture was taken while well was making tremendous amount of gas from a total depth of 10,239 feet

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REED 'B-R' Drill Collar and 3-Blade Drilling Bit with Core Barrel in position

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REED
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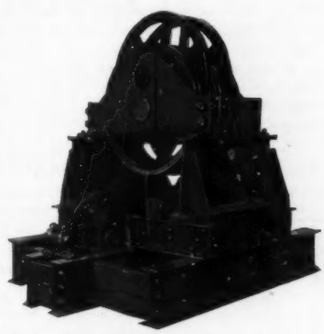

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7-Sheave — 300 Tons
8-Sheave — 360 Tons
9-Sheave — 360 Tons

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California Field Report

By
L. P. STOCKMAN

Indications of Three Prolific Pools in San Joaquin Valley

LOS ANGELES, Calif., May 23.—Three new oil fields and possibly a fourth appear probable as a result of aggressive exploration work in San Joaquin Basin. In addition to these discoveries Standard Oil Co. has logged the top of the Rio Bravo zone in No. 11-2 Kern County Land in the Greeley field in Kern County, in section 20-29-26, at 11,505 feet and had cored 15 feet of rich oil sand when the drill pipe stuck at 11,520 feet. The coring of this deep zone indicates that the same horizon may also be expected in the Ten Section and Canal fields. The three new fields on the horizon are at Buena Vista Lake, where Ohio Oil Co. cored the pay at 10,022 feet; in the Stevens area in Kern County, where Continental Oil Co. cored oil sand at 8,183 feet, and on San Joaquin Ridge where Petroleum Securities cored one of the richest oil sands ever picked up in California at 6,711 to 6,842 feet.

Ohio Oil Co. decided not to make a production test of its No. 8-A Kern County Land in section 32-31-26 at Buena Vista Lake and is drilling ahead to determine the possibility of securing commercial production in a lower horizon. As a result, it may be several months before this well is given a production test. Sufficient oil sand has been logged to make a commercial producer and so this district, heretofore strictly a dry gas field, is definitely assured of oil production whenever desired.

In the Stevens section of Kern County, Continental Oil Co. has cored 69 feet of oil sand in No. 1-E Kern County Land in section 17-30-26 at 8,183-8,252 feet. This zone, as well as the zone cored by Ohio Oil Co. at Buena Vista Lake, is the Stevens zone first proved productive by Shell Oil Co. in the Ten Section field. The Stevens district is approximately 2 miles north of the Ten Section field.

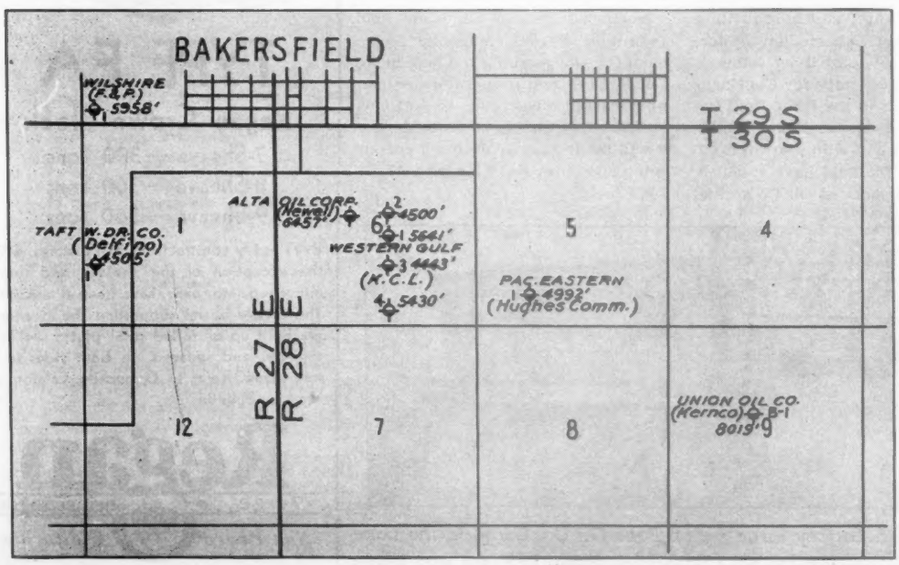
No. 1 Gatchel of Petroleum Securities Co., on San Joaquin Ridge district in section 18-20-16, has logged two distinct zones, the first at 6,711 feet and the second at 6,842 feet. This well was shut down immediately after coring the second horizon because of the existing overproduction of crude oil. Litigation has subsequently arisen in the area, however, and the company may find it advantageous to proceed with a production test. This legal battle does not involve Petroleum Securities in any way, as it is a partition suit involving a group of property owners in section 7-20-16 who have petitioned the superior court at Fresno for a division of property. No. 1 Gatchel appears definitely assured of resulting in commercial production when given the chance. In addition to these new oil fields which appear on the horizon as almost certainties, two new dry gas fields are expected to be proved up within a few weeks. One of these is in the Willows district of Glenn County, where Ohio Oil Co. is drilling a second wildcat following loss of the first test by a gas blowout, and in the Potrero Hills section of Solano County where Richfield Oil Corp. is drilling a wildcat that almost got away from the crew last week. Ohio Oil Co.'s wildcat in the Willows district is No. 1-A Willard in section 18-20-2 now drilling ahead at 3,415 feet. Richfield Oil Corp.'s well which blew out while the crew was pulling a wire line core barrel is No. 1 Potrero Hills in section 10-4-1, with top of the possibly productive gas zone at 3,245 feet.

TANKER SHIPMENTS FROM LOS ANGELES TO DOMESTIC AND FOREIGN PORTS

	May 13		May 6			
	Total this week	Daily average	Total last week	Daily average	This year to date	Same time last year
Intercoastal-domestic—						
Crude oil	.....	.....	.....	.....	140,394	.....
Diesel and gas oil	.....	.....	.....	.....	.....	176,726
Gasoline	118,279	16,897	.....	.....	1,040,057	1,121,952
Kerosene	.....	.....	.....	.....	199,453	130,040
Foreign exports—						
Crude oil	374,459	53,494	724,155	103,451	9,539,023	4,906,721
Fuel oil	137,080	19,583	185,535	26,505	2,918,859	5,126,602
Diesel and gas oil	27,908	3,987	108,106	15,444	2,115,692	2,567,630
Gasoline	206,301	29,472	37,156	5,308	2,546,137	2,496,611
Kerosene	67,411	9,630	21,192	3,027	499,574	894,236
Other unfinished oil	.....	.....	.....	.....	.....	402,700
Coastwise-domestic—						
Crude oil	90,949	12,992	273,550	39,079	4,432,387	2,318,408
Fuel oil	97,557	13,937	280,223	40,032	4,172,995	5,430,172
Diesel and gas oil	7,482	1,069	13,437	1,920	642,206	940,160
Gasoline	255,769	36,538	403,046	57,578	5,566,407	4,554,770
Kerosene	12,243	1,749	.....	.....	118,286	69,559

TANKER SHIPMENTS FROM SAN FRANCISCO TO DOMESTIC AND FOREIGN PORTS

Intercoastal-domestic—						
Diesel and gas oil	.....	.....	.....	.....	178,662	152,932
Gasoline	.....	.....	.....	.....	9,499	25,778
Asphalt	71,982	10,283	.....	.....	284,401	65,790
Lubricants	.....	.....	.....	.....	3,009	6,848
Foreign exports—						
Crude oil	181,783	25,969	73,992	10,570	2,157,698	1,057,394
Fuel oil	133,416	19,059	29,613	4,230	832,223	657,730
Diesel and gas oil	70,214	10,031	.....	.....	599,508	1,043,880
Gasoline	.....	.....	102,738	14,677	1,676,440	2,072,876
Kerosene	.....	.....	.....	.....	301,247	285,903
Lubricants	1,186	169	.....	.....	149,473	242,405
Coastwise-domestic—						
Fuel oil	112,413	16,059	138,122	19,732	2,386,923	2,153,878
Diesel and gas oil	28,019	4,003	16,065	2,295	583,376	263,129
Gasoline	131,589	18,798	140,387	20,055	2,332,991	1,663,576
Kerosene	.....	.....	.....	.....	257,363	66,108



Richfield Oil Corp. has secured extensive leases in the Union Avenue district of Kern County and will make location for a new wildcat upon conclusion of a seismograph survey

Montebello

In the Montebello field of Los Angeles Basin three wells were completed. No. 25 Monterey of St. Helens Petroleum Co. was completed flowing 1,940 bbls. of clean 37.8-gravity oil and 2,500,000 feet of gas per day, No. 1 Manz of McVicar & Rood brought in flowing 2,610 bbls. of 37.8-gravity oil, cutting 8 per cent, and 5,000,000 feet of gas daily, and Union Oil Co. No. 1 Paul Howard completed flowing 746 bbls. of 35.6-gravity oil cutting 41.7 per cent, and 400,000 feet of natural gas per day.

No. 1 Manz of McVicar & Rood was originally drilled and abandoned by Superior Oil Co. and the new operators reentered the old hole and resumed drilling operations. This well was finished with 406 feet of 5-inch liner carrying perforations at 5,377-5,573 feet and at 5,719-5,780 feet and was cemented through perforations at 5,717 feet. Bottom of the hole is at 5,780 feet and the well came in almost without swabbing. No. 25 Monterey of St. Helens Petroleum Co. was bottomed at 5,790 feet and finished with 445 feet of 6⅝-inch Securaloy liner including 75 feet of perforated on bottom. This new well is flowing through two 1½-inch beans and shows a tubing pressure of 300 pounds and a casing pressure of 650 pounds. No. 1 Paul Howard of Union Oil Co. an edge well failed to clean up but will be allowed to flow from its present depth for another several days at least. This well was carried down to 6,244 feet but the company is only producing from the upper part of the hole as a plug was inserted at 5,715 feet. The hole was finished with 417 feet of 6⅝-inch liner including 74 feet of 120-mesh lander on top of the plug.

The next completion expected to be listed in the Montebello field is No. 1 Wilcox which has been bottomed at 6,248 feet. All three new wells completed in the Montebello field during the current week

are located in the western extension and were finished flowing from the Pliocene. No. 1 Wilcox, unless plans are changed at the last moment, will be completed in the Miocene, as No. 1 Paul Howard proved rather conclusively that the overlying Pliocene was definitely wet. No. 26 Monterey of St. Helens Petroleum Co. tested wet, and the 9⅝-inch water string landed at 5,445 feet has been recemented.

Wilmington

There does not seem to be much hope of the Wilmington field showing any additional curtailment as long as operators are permitted to produce 90,000 bbls. of oil before cutting back production. State production, reflecting an overage of about 40,000 bbls. per day at Wilmington, has been hovering around 700,000 bbls. daily for the past week. The state's maximum daily quota was set at 624,755 bbls. The only redeeming feature in connection with existing conditions is that offshore shipments have been holding up in good shape and thus have alleviated the situation. There were seven new wells completed in the Wilmington field this week but only two of them registered substantial production as five out of the total were finished in the Ranger zone which does not have the kick shown by the Terminal zone. Late this week operators with one or two exceptions agreed to shut in production from the Ranger zone in the eastern end of the field and limit takings from the Terminal. This action if successfully carried out will have the effect of reducing the field's overage and consequently cut down the excess production of the state.

Hancock Oil Co. No. 11-B Harbor was finished flowing 3,557 bbls. of clean 28.3-gravity oil from the Terminal zone at 4,050 feet and its No. 16-B was completed flowing 3,680 bbls. of clean 27.4-gravity oil per day from 4,048 feet. Same company's No. 17-B, the Ranger zone completion, was brought in flowing 480 bbls. of clean 17.8-gravity oil daily from 3,010 feet after the hole had been finished with 600 feet of 6⅝-inch liner including 450 feet of 50-mesh landed on bottom. Macson Oil Co. No. 55-3-C, another Ranger zone completion, was completed flowing 349 bbls. of clean 15.9-gravity oil per day through 23/64-inch bean from 3,050 feet.

Richfield Oil Corp. completed two new wells on the Pacific Dock lease, both in the Ranger zone, as the Terminal zone does not extend as far north as the Pacific Dock property. No. 19 was completed flowing 540 bbls. of clean 19.2-gravity oil daily from 3,140 feet and well No. 20 was completed pumping 348 bbls. of clean 18.9-gravity oil per day from 3,245 feet. No. 19 Pacific Dock was finished with 357 feet of 6⅝-inch liner including 306 feet of perforated, and No. 20 Pacific Dock was finished with 370 feet of 6⅝-inch liner including 360 feet of perforated. Both wells were acidized before completion. Early in the week, General Petroleum Corp. completed No. 30 Ford flowing 898 bbls. of clean 21.5-gravity oil daily from the Ranger zone at 2,950 feet after finishing the hole with 477 feet of 6⅝-inch liner including 371 feet of 50-mesh landed at 2,948 feet and 2,451 feet of 3-inch tubing. Late in the week Gus Pongratz recompleted No. 2 Gilmore flowing 310 bbls. of 16.5-gravity oil per day after deepening the hole to 3,685 feet and landing 743 feet of 5¾-inch liner carrying perforations at 2,977-3,250 feet, 3,435-3,605 feet and at 3,650-3,680 feet and cementing through perforations at 3,430 feet and 3,645 feet.

San Joaquin Valley

Shell Oil Co. completed two excellent wells in the Ten Section this week and began work on two additional wells. Shell's new producers were No. 34-30-A Kern County Land in section 30-30-26 completed flowing 3,780 bbls. of clean 34.1-gravity oil and 3,540,000 feet of natural gas per day from 8,200 feet and No. 21-32-B Kern County Land in section 32-30-26 finished flowing 3,260 bbls. of clean 34.5-gravity oil and 1,860,000 feet of gas daily from 8,220 feet. In the Round Mountain field of Kern County, Shell Oil Co. completed No. 19 Freeman in section 20-28-29 pumping 783 bbls. of clean 16.9-gravity oil per day from 1,830 feet and immediately spudded in No. 17 Freeman in the same section. The company has derrick up for No. 3 on the Lilly-Olcese property in section 21-28-29. Crestmont Oil Co. completed No. 3 Staley pumping 267 bbls. of clean 16.3-gravity oil per day after deepening the hole from 1,680 feet to 1,702 feet.

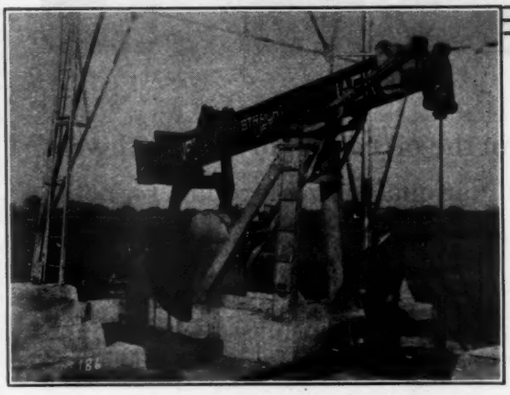
Wasco Field

Four new wells are scheduled to get under way in the deep Wasco field of Kern County where Continental Oil Co. discovered a highly productive oil zone at 15,004 feet. June 10 is the deadline for the starting of necessary work, but Continental Oil Co. is getting started ahead of time as Standard Oil Co. has staked location for three offsets. The former has already started rig construction for No. 3-A Kern County Land in section 8-27-24 and Standard should have material on ground within the next few days. Two of Standard's wells will be drilled in section 17-27-24 on Kern County Land Co. property and another will be drilled on the Mushrush property in section 7-27-24. Union Oil Co. has not yet completed a production test on No. 1 Berry in the Arvin district in the extreme southern end of San Joaquin Basin, although a preliminary pumping test indicated a potential of 73 bbls. per day. It is possible that the productive zone has either been mudded off or cemented off, as the wildcat, bottomed at 6,812 feet, but whipstocked and redrilled to 6,135 feet and finished with 264 feet of 6⅝-inch liner including 215 feet of perforated, should have more kick and larger production. Continental Oil Co. has taken over the Seaboard Oil Co.'s wildcat a few miles southeast of the Wasco field and will resume deepening at 10,244 feet. This geophysical high looks just as promising as Wasco did previous to completion of the discovery well.

In the Kettleman North dome field, Standard Oil Co. has completed No. 87-1-P in section 1-22-17 flowing 1,894 bbls. of 35.8-gravity oil and 38 bbls. of water along with 1,000,000 feet of natural gas per day from the Temblor at 8,045 feet. There are three wells rotating ahead in the North dome field below 10,200 feet in search of deep Eocene production.

Coastal District

Four wells were completed in the Santa Maria Valley field of Santa Barbara County this week. Union Oil Co.'s new low crude-oil price schedule went into effect May 20, and operators have greatly reduced the amount and scope of work in this field. Hancock Oil Co. and R. R. Bush Oil Co., jointly developing acreage



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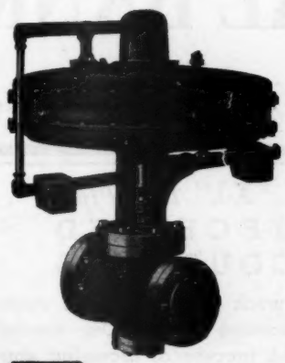

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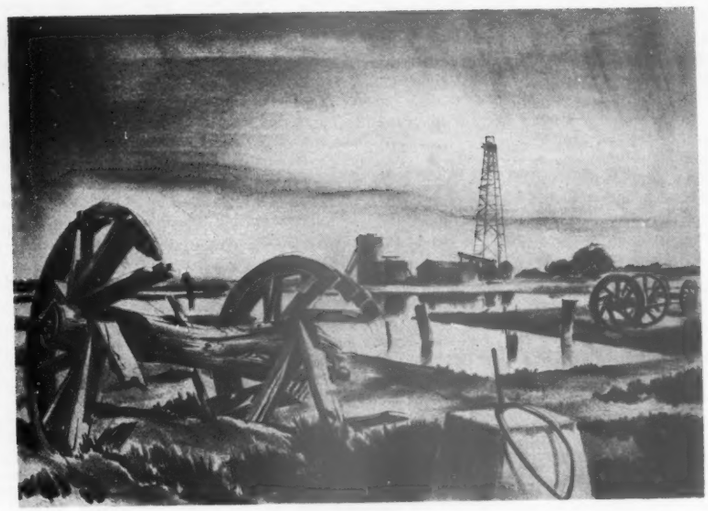

From a lithograph by E. M. Schwetz

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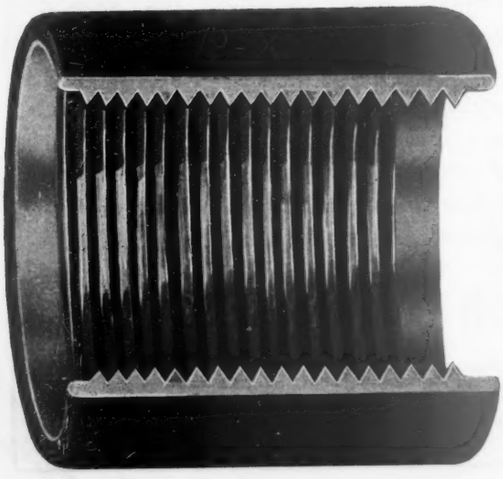

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in the Santa Maria Valley field, completed No. 2 Bradley in section 26-10-34 flowing 759 bbls. of clean 16.3-gravity oil per day from 5,030 feet after finishing the hole with 564 feet of 6⅝-inch liner including 536 feet of perforated landed at 5,028 feet. Sunshine Oil Co. No. 4 Wallace which has picked up top of the Monterey at 3,990 feet and was bottomed in the Franciscan basement at 4,379 feet has been completed flowing 1,845 bbls. of very clean 16.2-gravity oil per day aftter the hole had been finished with 407 feet of 5⅝-inch liner including 375 feet of perforated landed on bottom. In the extreme western end of the Santa Maria Valley field, Union Oil Co. completed No. 3 Le Roy in section 13-10-35 pumping 648 bbls. of clean 17.8-gravity oil per day from 5,394 feet after landing 435 feet of blank liner at 5,394 feet and subsequently perforating at 5,280-5,394 feet and at 4,984-5,238 feet. Top of the Sisquoc was logged at 4,275 feet, top of the Monterey at 4,972 feet and top of the Franciscan basement at 5,373 feet. No. 4 Jones Gallison in section 26-10-34 of California Lands, Inc., has been completed pumping 472 bbls. of relatively clean 14.1-gravity oil daily from 5,330 feet, after the hole had been carried down to 5,404 feet and then plugged back and finished with 568 feet of 7-inch liner including 517 feet of perforated.

Rincon Field

In the Rincon field of the Coastal area, two former producing wells were recompleted this week after deepening operations and both resulted in satisfactory production. Chanslor Canfield Midway Oil Co. returned No. 22-B Hobson to production flowing 306 bbls. of clean 28.9-gravity oil daily after deepening the hole from 4,250 feet to 4,500 feet and Richfield Oil Corp. recompleted No. 6-F Hobson State doing 249 bbls. of very clean 31.1-gravity oil per day on a compressor from 2,580 feet. This company has staked location for No. 8-F Hobson in section 8-3-24 and an early spud is anticipated. In the Padre Canyon field, Chanslor Canfield Midway Oil Co. has started erection of a new derrick for No. 7 Oakgrove in section 23-3-24 and drilling equipment will be on ground shortly. The terrain in this district is quite rough and it usually requires several weeks before drilling operations actually get under way after location has been staked. Two new wells are expected to be completed in the Ventura Avenue field within another fortnight as Shell Oil Co. No. 94 Taylor is going ahead in the pay at 8,752 feet and Tide Water Associated Oil Co. No. 19 Ventura Land & Water is in oil sand at 8,710 feet.

Los Angeles Basin

In the Rosecrans field Union Oil Co. has completed No. 19 Rosecrans in the O'Dea zone of Miocene age flowing 1,025 bbls. of clean 32.3-gravity oil and 860,000 feet of natural gas per day through a 48/64-inch bean from 7,633 feet. This new well which is flowing under a tubing pressure of 300 pounds and a casing pressure of 1,000 pounds was finished with 374 feet of 5¾-inch liner including 341 feet of 120-mesh landed at 7,629 feet. In the West Coyote field of Los Angeles Basin Standard Oil Co. completed Nos. 65 and 66 on the Emery lease pumping 222 bbls. and 126 bbls. per day respectively. The former was finished with 296 feet of 6⅝-inch liner landed on bottom at 4,174 feet and the latter was completed with 150 feet of 6⅝-inch liner landed at 4,174 feet. No. 55 Emery was carried down to 4,205 feet and then plugged back to 4,175 feet. Two new wells were completed in the Long Beach field but were relatively small producers. No. 2 Poole of Hilldon Oil Co. was brought in pumping 281 bbls. of very clean 23.8-gravity oil per day from 4,167 feet and Shell Oil Co. No. 44 Alamitos was completed pumping 151 bbls. of relatively clean 23.9-gravity oil daily from 4,765 feet after the hole had been carried down to 5,300 feet and then plugged back. In the Dominguez field, Shell Oil Co. finished No. 94 Reyes flowing by heads at the rate of 140 bbls. of 24.9-gravity oil daily from 7,460 feet. Preparations are under way to put the well on gas lift and make a potential production test.

Drilling operations are showing a general decline in the Torrance field again due to the recent completion of a number of small wells. Completions at Torrance have shown great variations in initials and are characterized by wide fluctuations in both quantity and quality of crude oil produced. During the current week both of the two wells recompleted showed satisfactory production as Neal Anderson No. 1 Torrance was returned to production pumping 270 bbls. of very clean 27.2-gravity oil daily from 4,956

(Continued on Page 95)

Texas and Louisiana Gulf

By
NEIL WILLIAMS

Another Prospective Pool on the Galveston County Shore

HOUSTON, Tex., May 23.—Sun Oil Co. No. 1 Cade, a wildcat on the Boliva Peninsula Prospect on the coast line of the Gulf of Mexico, Galveston County, made its appearance as a possible pool opener when it attempted to blow out after drilling 4 feet of soft formation at 8,008-12 feet. The well began flowing shale- and gas-cut drilling mud outside of the drill pipe and a blowout was prevented by closing the rams on the blowout preventer and building up the mud weight to 11.6 pounds. The hole was deepened to 8,090 feet, where the drill stem became stuck. The well is on a highly regarded geophysical prospect of several thousand acres. On the same peninsula, which is east of Galveston and due east of the High Island field, the same company No. 1 Atkins, in what is known as the Marshy Point area, in the Burrell Franks Survey, is drilling below 5,962 feet.

The Cedar Point field, Galveston Bay, was apparently extended about 1,800 feet east by Humble Oil & Refining Co. No. 2-95 State, which has cemented casing for completion after topping oil sand at 5,988 feet and coring the section to a total depth of 5,998 feet. The top of the sand is a few feet lower than in the discovery well. The water table of the field was definitely established, as Standard Oil Co. of Texas and Salt Dome Oil Corp. is pulling screen and liner in No. 1 State, Tract 119. Perforations were made at intervals from 6,040 to 6,098 feet. The casing will be reperforated at 5,973-6,033 feet where a solid sand section was logged.

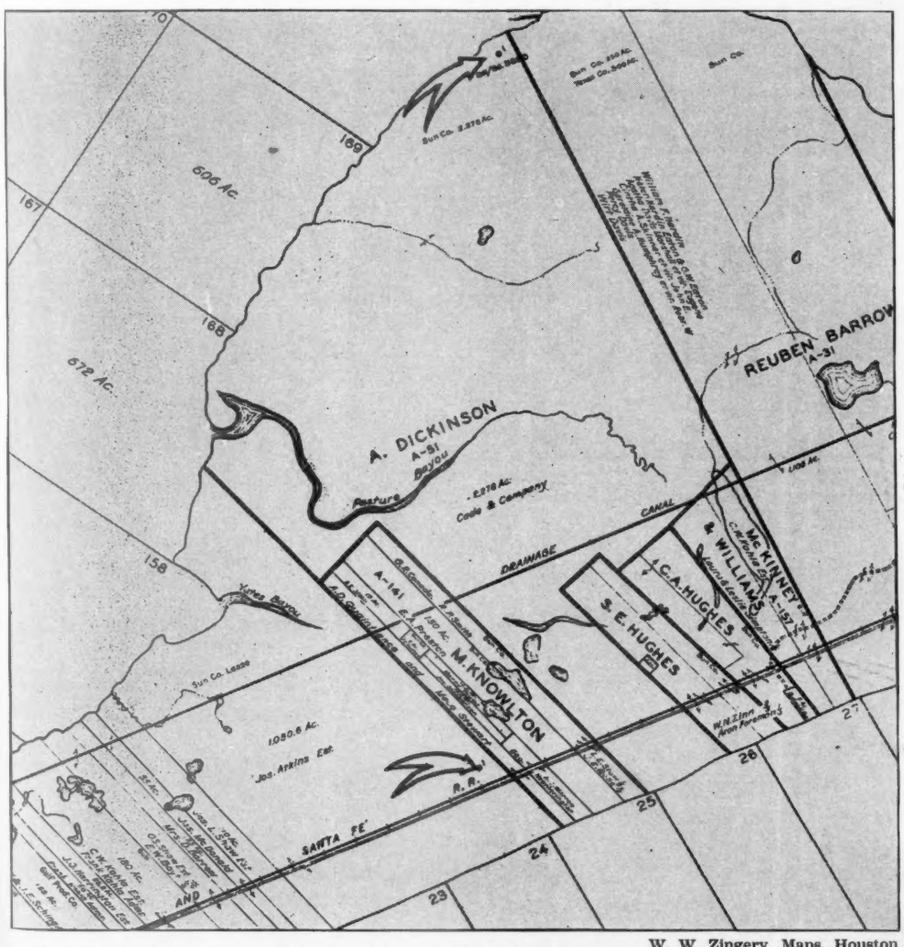
Eureka's Fourth Producer

The Eureka field on the northwest edge of the Houston city limits, received its fourth producer, and another well had cored the sand. Jack Frazier No. 2 Vollmer-Neiman, 933 feet east of production, perforated casing at 7,717-30 feet and was flowing into the burning-pits making an ungauged amount of oil and wash water. Northeast of Frazier No. 1 Vollmer-Neiman, the discovery oil well, Houston Oil Co. No. 2 Helberg & Lackner topped oil sand at 7,691 feet and is bottomed at 7,727 feet. A Schlumberger test is being made and casing is expected to be cemented. The sand section was topped a few feet lower than in the discovery well which indicates that the prolific section of the field lies to the east of the distillate production.

The northwest limits of the Fairbanks field, Harris County, was believed to have been defined by Carroll Oil Co. No. 1 Ralph Johnston which is shutdown after swabbing some oil and wash water, with a salty taste. The hole is bottomed at 6,864 feet and the casing was perforated at 6,839-43 feet. The sand section in the well is said to have been poor and little hope is given that the well will be a producer. Five oil wells were completed and five locations made last week. Amerada Petroleum Corp. and Stanolind Oil & Gas Co. made locations for No. 1 and No. 2 Mary Foley, J. Clarkson Survey; No. 1 A. Sebek, W. K. Hamblen Survey; No. 1 E. W. Thompson, J. Clarkson Survey; No. 1 W. E. Denman, J. Waugh Survey, and No. 1 J. F. Sebek, G. Williams Survey.

On the Citrus Grove Prospect, Matagorda County, Sun Oil Co. No. 1 Robbins, C. H. Vandeveer League, perforated casing at 9,970-10,030 feet, and flowed a small amount of distillate and salt water. The perforations have been squeezed off and the casing will be reperforated at 9,430-9,520 feet. This well was being abandoned when it attempted to blow out several weeks ago.

Preparations were being made by Gulf Oil Corp. to test No. 2 Ragan which is expected to open the Segno field's third producing horizon. The hole was drilled to 9,154 feet and the casing perforations made at 8,146-61 feet. This is the same section which showed several hundred feet of pipe line oil in a drill stem test. The success of deep drilling by Gulf, in this field, which originally produced from the Cockfield sand has encouraged deeper drilling in the balance of the field along the Conroe Trend.



W. W. Zingery, Maps, Houston

Bolivar Peninsula area, Galveston County, showing two interesting wildcats being drilled by Sun Oil Co. The most northerly test, No. 1 Cade, attempted to blowout in the past week

Seabreeze Extend Southerly

Sun Oil Co. No. 1 R. J. Barrow, reported in last week's review as a probable south extension to the Seabreeze field, Chambers County, flowed 752 bbls. of oil through a quarter-inch choke. Production was obtained by perforating casing at 8,472-77 feet, after previous tests at 8,500-08 and 8,485-92 feet tested salt water.

Material is being moved in to the Greens Lake field, Galveston County, by Sun Oil Co. for No. 2 Houston Farms Development Co., Daniel Buckley Survey, about 2 miles southeast of the discovery well, and a half mile east of No. 1 Houston Farms Development Co., a dry hole. This field received quite an active drilling campaign following the completion of the discovery well, but the results were not encouraging. The present well is scheduled to be drilled to 7,500 feet.

A third location for the Pearland area, Brazoria County, has been made by the Pearland Oil Co. for No. 1 W. S. Craig. It will be to a depth of 7,500 feet and is located northeast of Albert Plummer's recent dry hole.

Coastal Louisiana

New sands for several fields in the Coastal Louisiana district were indicated in the past week. In the Choctaw field, Iberville Parish, Louisiana Crusader Oil Co. No. 2 Schwing, cored sand showing oil at 8,250-56 feet, and a drill stem test was expected to be made following the running of a Schlumberger survey. Location is in section 29-8s-11e. In the same parish and located at Bayou Blue, Humble Oil & Refining Co. No. 6 Wilbert recovered 2,600 feet of 35-gravity oil on a drill stem test at 6,990-7,006 feet, and final completion is being made. The hole is bottomed at 7,006 feet.

In the Abbeville field, Vermilion Parish, Continental Oil Co. is testing No. 1 Motty, northeast of production. The hole has been plugged back from 8,242 feet to 6,460 feet and 7-inch casing has been cemented at that point. This is a new horizon for the field.

In the Lake Long field, Lafourche Parish, Fohs Oil Co. No. 4 State has been brought under control after it blew out and flowed an estimated 50,000,000 feet of gas daily. The blowout occurred after drilling out plug at 10,239 feet, where 7-inch casing was cemented.

In the newly opened Quarantine Bay field, Plaquemines Parish, Gulf Coast Corp. No. 4 State is drilling in sandy shale below 9,204 feet after logging several en-

(Continued on Page 108)

Oklahoma Operations

By
DAL DALRYMPLE

Discovery of Four Oil Pools in Three Counties Indicated

With the International Petroleum Exposition at Tulsa holding the center of the oil stage the past week, it was necessary for Oklahoma field operations to provide something out of the ordinary in order to share in the spotlight. So Oklahoma wildcats did just that, four of the outposts showing sufficient oil and gas to indicate the opening of as many pools.

W. A. Delaney and others No. 1 Bugher, SE SE SW section 12-7-2w, wildcat near Noble in Cleveland County, opened a Wilcox sand pool Friday and was shut in for tankage after flowing from 50 to 100 bbls. of oil an hour on preliminary tests. A small amount of water appeared with the oil, but operators were of the opinion it was wash water. Gravity of the oil was 37.5 degrees. Gas was estimated at 3,000,000 feet daily. Seven-inch casing was set at 7,455 feet and total depth was 7,682 feet in sand. It was to be more thoroughly tested this week.

Sinclair Prairie Oil Co. No. 1 Crews, SW SW NE section 27-16-1e, east of meridian in Logan County, was given a good chance to open a pool after showing oil in Wilcox and Simpson formations. A drill stem test in Wilcox sand showed more than 300 feet of oil in 40 minutes. A test in the Upper Simpson also showed oil. The hole was bottomed at 5,215 feet in Wilcox sand topped at 5,193 feet. Operators were running casing preparatory to testing.

Texas Co. No. 1 Longan, NW cor. section 12-17-1e, about 5 miles south of the Ramsey pool in Payne County and east of the Langston pool of Logan County, was to be tested after erection of tankage. It blew in during the past week for an estimated 10,000,000 feet of gas and an unestimated amount of oil, after plugging back to 4,960 feet from total depth of 5,006 feet in dry Wilcox sand. The oil was thought to be coming from the Upper Wilcox sand.

The fourth promising looking wildcat of the week was R. L. Kemp and others No. 1 Rafferty, SE SE NE section 6-18-5, north of Cushing in Payne County. It was bottomed at 3,705 feet and had 500 feet of oil in the hole. Saturation was found at 3,663-83 feet in Wilcox sand. It may be shot before testing.

Wildcat Completions

Darby Petroleum Corp. No. 1-A Lillie, NW NW SW section 1-22-3e, wildcat between the Watchorn and Masham areas in Pawnee County, found Wilcox sand at 4,136 feet and was dry and abandoned at 4,148 feet, total depth.

Carter Oil Co. No. 1 Lydick, CE half NW NE section 23-15-4w, wildcat in the Navina area, Logan County, was dry and abandoned at 6,776 feet, total depth. It topped first Wilcox sand at 6,580 feet, second Wilcox sand at 6,727 feet, and had a slight showing of oil and gas.

Union Development Co. No. 1 Abbott, SW NW NE section 34-3n-6, wildcat northwest of the North Fitts area in Pontotoc County, had drill pipe stuck at 3,320 feet, total depth, and was abandoned. It had a showing of gas in cores at 2,490-2,510 feet.

Cowley and others No. 1 McCormick, SW SW SE section 27-2n-4e, wildcat west of Roff in southwestern Pontotoc County, was reported abandoned at 402 feet, total depth.

Stanolind Oil & Gas Co. and Amerada Petroleum Corp. No. 1 Ridgeway, NW NE NE section 24-3s-9, wildcat south of Boggy Depot in Atoka County, found Arbuckle lime at 4,790 feet, total depth 4,879 feet, plugged back to 3,325 feet, drilled out to 3,420 feet and shot. It was abandoned after bailing at the rate of 1 bbl. of water and 1 gallon of oil an hour. Oil Creek sand was topped at 3,843 feet.

Indian Territory Illuminating Oil Co. No. 1 Kichin, C SE SE section 17-22-5w, was location for a wildcat about 5 miles east of Enid in Garfield County.

J. Ben Russell and R. O. Ray No. 1 Hasler, NW NE NW section 4-1s-19w, wildcat, in northwestern Tillman County and east of the Tipton pool in Jackson County, was drilling below 3,054 feet. It is an old well being deepened from 2,754 feet.

Seminole County

Two producers were completed in the Dora pool, Seminole County. J. F. Smith No. 4 Harryman B, NE SE SW section 33-7-6, had Boggy sand at 2,831-80 feet, total depth 2,839 feet, was shot with 100 quarts and flowed 700 bbls. of oil in 24 hours.

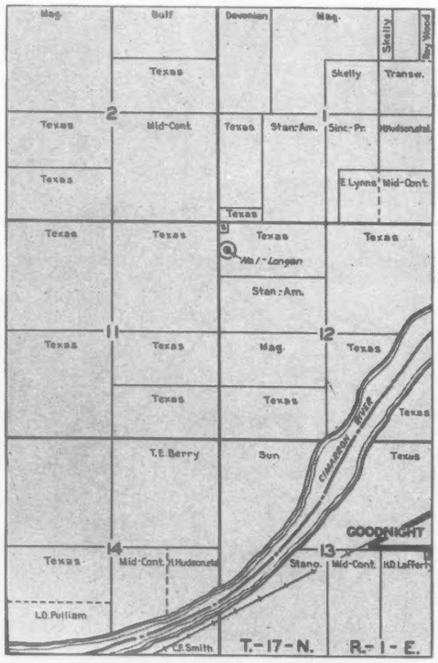
D. B. Malarnee No. 4 Shelton, SW SW NW section 33-7-6, was shot with 90 quarts in Boggy sand at 2,895-2,930 feet, total depth 2,935 feet, and flowed 600 bbls. of oil in 24 hours.

Atlantic Refining Co. No. 1 Bowles, NE NW NW section 22-6-6, Traugh pool, had Viola lime and Simpson pay at 3,545-69 feet, was acidized and pumped 175 bbls. of oil in 24 hours through perforations. It was bottomed at 3,645½ feet.

Continental Oil Co. and Deep Rock Oil Corp. No. 9 Harrison, NW NW SE section 4-7-7, an old well in the East Little River pool, was deepened from 3,203 feet to Cromwell sand at 3,281-88 feet, total depth 3,289 feet, pumped 50 bbls. of oil and 25 bbls. of water and was recompleted.

Texas Co. No. 2 Sandlen, NE SE SW section 29-9-6, an old well in the West Seminole area, was plugged back from 4,120 to 4,085 feet, drilled out to second Wilcox sand at 4,160-4,224 feet, perforated casing, pumped water and was abandoned.

New work in Seminole County: Boettcher Oil & Gas Co. No. 1 Morgan, SE NE NW section 8-5-7, wildcat, machine; Bryan Petroleum Co. No. 1 Ward, SW NW NW section 3-6-6, cellar and pits; Winkler & McQueen No. 6 Bruner B, NW NE NE section 4-6-6, spudded; W. A. Delaney No. 2 Swan, SW cor. section 18-6-6, set 10-inch casing at 100 feet, W.O.C.; Sun Oil Co. No. 1 Swan, SW SE SW section 18-6-6, location; same company's No. 1 Bemo, NW NE NW section 19-6-6, location; W. B. Pine No. 7 Williams, SW NW NE section 22-6-6, cellar and pits; Rogers & Rogers No. 1 Barnhardt, NW cor. section 8-6-8, drilling below 1,990 feet; Wood Oil Co. No. 1 Born, NW SE NE section 2-8-6, rig.



Mid-Continent Map Co., Tulsa

Texas Co. No. 1 Longan, section 12-17-1e, wildcat in Payne County, was showing as a probable pool opener

Estimated Daily Production

Estimated daily production for Oklahoma for the week ending May 21, and for the preceding week, was as follows:

	Barrels	
	May 21	May 14
Allen	5,525	5,275
Billings	6,450	6,250
Burbank	7,450	7,400
South Burbank	10,250	10,750
Balance Osage	18,250	18,000
Blackwell district	4,700	4,675
Bristow-Slick	7,025	6,975
Chandler	2,150	2,175
Crescent	6,350	5,200
Cromwell	3,100	3,075
Cushing-Shamrock	10,700	10,650
Duncan district	3,725	3,950
Edmond	7,125	7,475
Fish	3,775	3,425
Fitts	48,675	52,875
Jesse	2,750	3,525
Graham	5,025	4,225
Gray	975	850
Healdton	9,250	8,625
Hewitt	4,075	3,625
Keokuk	4,650	4,025
Konawa	1,525	1,250
Lucien	10,775	10,500
Moore	4,900	4,875
Oklahoma City	103,200	122,100
Olympic	5,875	5,850
Ramsey	950	950
Sasakwa	1,725	1,675
Sholem-Alechem	2,875	2,900
Seminole district:		
Bowlegs	8,975	8,375
Carr City	3,575	3,425
Dora	5,325	4,975
Earlsboro	4,975	4,550
South Earlsboro	550	500
East Earlsboro	5,225	5,350
Little River	7,475	7,750
East Little River	900	825
Maud	725	700
Mission	1,675	1,475
Seminole	7,850	6,525
East Seminole	1,725	1,750
Searight	2,600	2,500
Total Seminole	51,575	48,700
St. Louis-Pearson	21,250	20,750
Tatums	5,750	3,650
Tonkawa-Garber-Thomas	4,225	4,200
Wewoka	2,400	2,425
Yale-Jennings	3,825	3,800
Other pools	78,500	78,000
Total Oklahoma	471,325	484,650

Pontotoc County

Five wells were completed in the Bebee district, Pontotoc County. Lake Oil Co. No. 3 Gray B, SE NE SW section 25-5-4, had Viola lime at 2,490-2,585 feet, total depth, and pumped 140 bbls. of oil in 24 hours.

Ross Oil Co. No. 1 Bray, SW SE NW section 25-5-4, was shot and pumped 110 bbls. of oil in 24 hours. It had Viola lime at 2,560-2,607 feet, total depth 2,612 feet.

United Corp. of Massachusetts No. 2 Standridge, SW NW SE section 25-5-4, found Viola lime at 2,594-2,603 feet, total depth, and pumped 216 bbls. of oil and 1,680 bbls. of water in 24 hours.

Lake Oil Co. No. 1 Summers A, SE NE SE section 26-5-4, pumped 35 bbls. of oil and 5 bbls. of water in 24 hours from Viola lime at 2,499-2,603 feet, total depth.

Clark & Cowden No. 1-A Starrett, SW NE NE section 21-5-5, had Viola lime at 2,492-2,535 feet, total depth 2,545 feet, and pumped 170 bbls. of oil in 24 hours.

In the Fitts field, W. A. Delaney No. 1-A Horn,

NW SW NW section 23-2n-7, had McAlester pay at 1,272-77 feet, total depth, and pumped 65 bbls. of oil in 24 hours.

Dickson Oil Corp. No. 4 Jackson, NE SW SW section 22-5-6, in the Conservation district, was dry and abandoned at 1,843 feet, total depth.

Union Development Co. No. 1-A Abbott, SW NW NE section 34-3n-6, wildcat, was drilling below 150 feet.

Lake Oil Co. No. 5 Gray B, SE SE SW section 25-5-4, Bebee field, had dug cellar and pits.

W. A. Delaney and others No. 2 Starrett, NW SE NE section 21-5-5, had dug cellar and pits.

Pottawatomie County

Magnolia Petroleum Co. No. 4 Hilton, SW NW NW section 22-7-4, St. Louis field, Pottawatomie County, flowed 636 bbls. of oil in 24 hours from Calvin sand pay at 3,173-95 feet, total depth.

Judge Holden No. 1 Gibbs, NE cor. section 23-7-4, had Calvin sand at 3,114-23 feet, total depth, and flowed 130 bbls. of oil in 24 hours.

Magnolia Petroleum Co. No. 5 Caudle, NW NE SW section 13-7-4, found Simpson pay at 4,000-4,213 feet, total depth 4,219 feet, plugged back to 4,213 feet and pumped 20 bbls. of oil in eight hours, heading off.

A. C. Fletcher No. 1-A Davidson, NW NE NE section 22-7-4, was an abandoned location.

First reports of new operations in Pottawatomie County: Denver Producing & Refining Co. No. 1 Zoeller, NW SE SE section 5-6-5, cellar; Conley Drilling Co. No. 4 Vinson, NW NE NE section 13-7-4, was drilling below 1,810 feet; Magnolia Petroleum Co. No. 3 Latimer, NE SW NW section 17-7-4, pits; J. F. Smith and others No. 1 Latimer, NW cor. section 21-7-4, location; J. W. Clark and others No. 1 McGee, SW NW NW section 27-7-4, rig; Taber & Coleman No. 2 Green, NE SW NE section 35-7-4, rigging up rotary; Magnolia Petroleum Co. No. 2 Tull-fyke C, SE cor. section 20-7-5, rig; same company's No. 3 Nickolas, NE NW NW section 31-7-5, rig.

Sinclair Prairie Oil Co. No. 1 Lynn, NE NE NW section 30-7-5, an old well in the St. Louis field, was plugged back from 4,335 feet to 4,205 feet, acidized and pumped 10 bbls. of oil and 30 bbls. of water, recompleted.

Noble County

W. O. Roberts and others No. 1 Dentley, NE NE NW section 6-20-2w, North Lucien pool, Noble County, had first Wilcox sand at 5,385 feet, was bottomed at 5,440 feet, swabbed and flowed 130 bbls. of oil in six hours and made potential of 640 bbls.

Logan County

Eason Oil Co. and others No. 1 Downing, SW SW NE section 12-17-1w, Langston district, Logan County, had Mississippi formation at 4,880-4,975 feet, total depth, and was dry and abandoned.

Grant County

Carter Oil Co. and others No. 2 Crisman, C E half NW NW section 16-25-3w, Lamont district, Grant County, found Wilcox sand at 5,424 feet, total depth 5,432½ feet, Schlumberger test indicated water and it was abandoned.

Lincoln County

Summit Drilling Co. No. 1 Clark, SE SW NE section 35-15-2e, an old well in the North Wellston pool, Lincoln County, was plugged back from 5,125 feet to 5,028 feet, shot with 10 quarts at 4,512-20 feet and produced 2,700,000 feet of gas, recompleted.

Garvin County

Skelly Oil Co. No. 1 Burr, SE NE SW section 29-1n-3w, Tussy pool, Garvin County, was bottomed at 3,030 feet, plugged back to 2,725 feet, tested water and was abandoned.

Caddo County

Magnolia Petroleum Co. had dug pits at No. 8 Surbeck, SE cor. section 3-5-9w, new test in the Cement field, Caddo County.

Carter County

Magnolia Petroleum Co. No. 79 Richards, NE SW NE section 6-4s-3w, Healdton field, Carter County, was bottomed at 1,197 feet, and pumped 24 bbls. of oil and 6 bbls. of water in 10 hours.

Ideal Oil & Gas Co. No. 6 Scroggins, NE SE SE section 32-3s-3w, an old well, was deepened from 1,138 feet to 1,229 feet, tested water and was abandoned.

E. B. Evans No. 6 Ratliff, C W half NW SW section 28-1s-2w, was a temporarily abandoned location.

Coal County

Choctaw Oil & Gas Co. No. 1 Johnson, C W half NE NW section 7-1n-8, Jesse district, Coal County, and same company's No. 2 Johnson, C E half NE NW section 7-1n-8, were abandoned locations.

Stephens County

George L. Pace and others No. 18 Allen, SW SE NE section 3-2s-8w, Empire pool, Stephens County, had oil sand at 2,208-12 feet, total depth, and pumped 100 bbls. of oil in the first 24 hours.

L. F. Jones and others No. 8 Hardin, SW SW NW section 30-1n-8w, North Duncan area, had sand at 1,990-2,014 feet, total depth, and pumped 50 bbls. of oil and 10 bbls. of water in 24 hours.

Gulf Oil Corp. No. 14-A, NE SE SE section 14-2s-4w, Milroy pool, pumped 10 bbls. of 26-gravity oil in 24 hours from sand at 468-497 feet, total depth.

George L. Pace and others No. 7 Pitts, NW NE SE section 3-2s-8w, was bottomed at 2,236 feet, plugged back to 1,900 feet, perforated casing and pumped 12 bbls. of oil and 12 bbls. of water daily.

Gulf Oil Corp. No. 17 Bowers, NW SE SE section 14-2s-4w, was a location in the Milroy pool. George L. Pace and others No. 19 Allen, NW SE NE section 3-2s-8w, Empire pool, was a derrick.

California Fields

(Continued from Page 92)

feet and Superior Oil Co. No. 6 Torrance was recompleted pumping 212 bbls. of clean 26.8-gravity oil per day from 4,970 feet. Superior No. 6 Torrance was finished with 1,596 feet of 4½-inch liner carrying perforations at 4,912-57 feet and at 4,912-57 feet while Neal Anderson No. 1 Torrance was finished with a 7-inch liner including 132 feet of perforated and cemented through perforations at 4,819 feet.

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North Louisiana, Arkansas

By
GEORGE WEBER

Blue Lake's Deep Discovery Starts Five New Operations

SHREVEPORT, La., May 23.—Discovery of a new producing area in the Blue Lake district of Sabine Parish stood out as the most important of the week's developments in the tri-state area. The deep discovery followed a similar show several weeks ago in a more shallow sand, but the present strike shows evidence of a definite new field.

Arkansas proration encountered some dissension during the past week, following recent allowable cuts, involving the first serious differences between operators and the Board of Conservation in the Schuler field. New rules were laid down for other recently developed producing areas.

Deep wildcat tests continued to hold considerable attention, the outstanding example being the deep Shongaloo test which has showings of red shale, sand and streaks of lime. This indicates that it may be approaching the Big lime, which is the principal object of the important key wildcat.

Blue Lake Discovery

The Sutton-Zwolle Oil Co. No. 1 Sabine Lumber Co., a deep Sabine Parish test in the Blue Lake area, this week again was the center of interest in North Louisiana. Operators were coring at 4,207 feet when the well blew out. It was successfully brought under control through use of a blowout preventer, and the drill stem was plugged off. During the first 18 hours of flow the test made an average of 43 bbls. per hour through two chokes, measuring three-eighths and one-half inch diameter. The flow varied from 30 to 50 bbls. per hour as the flow progressed in the 18-hour gauge. On Monday, the test was allowed to flow through the annular space between casing and drill stem, through a three-eighths inch choke, and production has held steadily since at the rate of 41 bbls. per hour. The only pressure gauge is on the drill stem, and pressure has been maintained at 995 pounds.

This marks the second showing of production in the deep test. The wildcat, located near several abandoned shallow wells of the Blue Lake field, found its initial showing late in February. On a drill stem test at 3,843-53 feet, 1,200 feet of pipe line oil was recovered, but subsequent operations failed to make a producer of it. After a shutdown period the test was resumed in April, and the recent strike is apparently a major discovery, after having shown substantial production for a week. Immediate development of the new field is anticipated. Albert Reich No. 1 Glaque, NE NE NE section 27-7n-14w, is rigging up and the F. W. Martin Drilling Co. No. 1 Sabine Lumber Co., C W half NE NE section 26-7n-14w, is moving in. In addition, the Sutton-Zwolle Oil Co. plans to move two more rotaries into the field, so that five wells are expected to be drilling within a few days.

The discovery well, in SE cor. NW NE section 23-7n-14w, is believed to be producing from a horizon between the Paluxy and the Glen Rose. The Blue Lake area is adjacent to the extensive Zwolle field.

Lisbon Activity

The entire tri-state area showed a considerable gain in new locations during the past week, totalling 36. Completions also were up, mainly due to a series of new oil wells brought in in the Lisbon field. Eight new wells for that field made aggregate initials of 7,380 bbls. per day, and raised the total number of producers in the field to 214. Lisbon has shared largely in the recent upturn in drilling activity, with the entrance of new producers, and the return of recently inactive ones.

In the adjacent Sugar Creek field of Claiborne Parish, the Union Producing Co.'s two tests were inciting interest. The company's No. 2 Brownfield, deepest current North Louisiana test, was reaming at 10,661 feet after setting 7-inch casing several days ago. The hole is being straightened.

Union No. 1 Coleman, a northwest outpost to Sugar Creek, made a drill stem test at 5,686-5,717 feet using half-inch chokes top and bottom. On the nine-minute test, the seat gave away after five minutes, and the recovery showed 120 feet of black oil, 30 feet of brackish water, 90 feet of oil-cut mud and 1,020 feet of drilling mud. Sand was then cored at 5,766-5,804 feet with a showing of gas in the top and a showing of oil in the last 5 feet. A Schlumberger survey was run, and operators are running casing with total depth at 5,847 feet.

Production by Pool

Estimated daily gross production all companies week ending May 20, 1938:

NORTH LOUISIANA

	Barrels
Bellevue	660
Caddo light	3,900
Caddo heavy	2,340
Converse	550
Cotton Valley heavy	100
Cotton Valley light	*9,650
De Soto and Red River	1,430
Elm Grove	370
Haynesville	2,910
Holly	80
Homer	2,640
Lisbon	7,175
Pleasant Hill	115
Rodessa	39,480
Sarepta-Carterville	310
Sligo	680
Sugar Creek	300
Urania	2,850
Zwolle†	1,565
Total	77,095

SOUTH ARKANSAS

Buckner	780
Champagnolle	1,220
El Dorado	1,880
Lisbon	270
Miller County	395
Nevada	635
Rodessa	6,590
Schuler	8,670
Smackover light	2,050
Smackover heavy	16,320
Stephens	565
Troy	1,240
Urbana	1,250
Village	270
Total	42,135

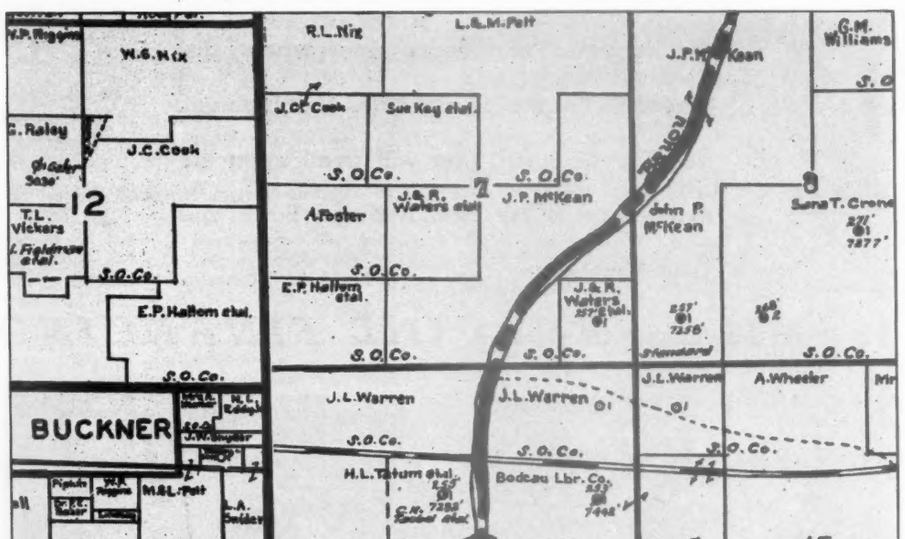
Texas side of Rodessa field 36,600 bbls. daily.

*5,890 bbls. is distillate.
†Included in Zwolle is Sutton Oil Co. No. 1 Sabine, (new producer), section 23-7e-14w, production. Gravity 33.3. Do not know whether oil is coming from 3,853 feet or total depth of 4,208 feet. Well averaged 550 bbls. per day this week.

Shongaloo Test

In northern Webster Parish, near the Arkansas line, Magnolia Petroleum Co. No. 1 Sexton Unit is believed to be approaching the Big lime, from showings in cuttings and cores. Drilling at 10,265 feet, the test showed red shale and streams of sand in the cuttings. Coring was begun immediately, and streaks of anhydrite were found. The latest report shows the test coring black shale and sandy lime at 10.33! feet. If the red shale and anhydrite are in the Buckner horizon, it indicates that the deep wildcat is approaching the Big lime, its principal object. The isolated position of the test, and the exploratory depths to which it has been carried, however, preclude any definite predictions on what it may encounter.

(Continued on Page 111)



Globe Map Co., Shreveport

The Buckner field of Columbia County, South Arkansas, will be extended shortly by Standard Oil Co. of Louisiana for No. 1 Water, a west offset to the discovery well. The test cored 45 feet of soft saturated lime and is running casing for completion

Rocky Mountain Area

By T. R. INGRAM

North Montana's Big Gasser; Revival in Southern Colorado

DENVER, Colo., May 23.—Wildcatting is resuming in southwestern Colorado along the New Mexico line with one new location released and one well reported standing full of oil. A test on the Dry Creek dome in Moffat County is spudding. The Gulf Oil Corp. wildcat in eastern Colorado is in the Arbuckle lime with nothing important showing.

The General Petroleum Corp.'s discovery well on Cole Creek in Wyoming, showed for 57 bbls. in one hour on a drill stem test, set casing and is preparing for production test. Two small wells were completed in the Osage field.

The A. B. Cobb well 5 miles north of the Cut Bank gas field in Montana gauged 40,000,000 feet of gas upon being deepened 13 feet. B. A. S. Aronow No. 2 Government, on west side of Kevin-Sunburst, is pumping and flowing 200 bbls. a day.

NEW MEXICO

Extension of the rapidly growing Vacuum field of Lea County 4 miles to the northwest was indicated at Repollo Oil Co. No. 1 State, Lease 197, SE section 6-17-34. It topped white lime high at 4,618 feet, had first showing of oil and gas at 4,644-53 feet, with a big increase at 4,656-60 feet and another increase at 4,677-80 feet. At 4,916 feet it swabbed an average of 22½ bbls. of oil an hour, operators keeping the well swabbed down so as not to impede drilling. The extensioner is due for early completion.

A Lea County wildcat 3 miles southeast of the Vacuum area failed to find production. It was Continental Oil Co. No. 1 State 16-I, C NW NE section 16-18-35. It had no showings of oil, gas or water and was dry and abandoned at 4,810 feet, total depth. Other Lea County completions of the week were as follows:

Texas Co. No. 2-O State, C SE NE section 36-17-34, Vacuum area, topped pay at 4,496 feet, total depth 4,750 feet, and flowed 230 bbls. of oil in four hours through open tubing. Gas gauged 500,000 feet.

Cities Service Oil Co. No. 3-A Closson A, C NE SE section 18-22-36, extended the South Eunice pool one-fourth mile westward. It found pay lime at 3,760 feet, was bottomed at 3,823 feet in lime and flowed 66 bbls. of oil an hour for six hours, naturally and through tubing. It had blown out at 3,539 feet with gas volume estimated in excess of 200,000,000 feet, one of the largest gas flows ever found in the state. Two thousand sacks of cement were used in a successful squeeze job, shutting off the gas.

Repollo Oil Co. No. 2-B State, NE SE NW section 7-22-36, flowed 571 bbls. of oil in 18 hours through tubing from pay topped at 3,742 feet, total depth 3,823 feet.

Gulf Oil Corp. No. 4-C Kutter, C SW NW section 18-19-37, had pay at 4,003 feet, total depth 4,039 feet, and flowed 143 bbls. of oil daily through tubing. Gas measured 602,880 feet. It is in the Monument area.

Continental Oil Co. No. 2 Jack A-20, C SE SE section 20-24-37, had pay at 3,490 feet, total depth 3,586 feet, was shot and flowed 72 bbls. of oil in three hours, with 943,000 feet of gas.

Carl B. King No. 1-A Stuart, NW NE NW section 14-25-37, Langlie area, flowed 70 bbls. of oil daily through tubing, with 5,000 feet of gas. Top of pay was 3,326 feet, total depth 3,395 feet.

Southern Petroleum Exploration Co. No. 2 Downes, C SW SW section 32-21-37, Hardy pool, had pay at 3,700 feet, total depth 3,772 feet, and flowed 15 bbls. of oil an hour through three-eighths inch choke.

Five producers and one failure were completed in Eddy County. B. M. Keohane and others No. 1 Shannon, SE cor. section 27-16-31, wildcat, had a slight showing of oil at 3,815 feet but water intruded and it was abandoned at 4,324 feet, total depth.

Premier Petroleum Co. No. 1 Beeson, NE SE SE section 28-17-30, which uncovered a new sand pay nearly 1 mile south of the Jackson pool, flowed 77 bbls. of oil daily through tubing and was completed. It topped sand at 3,240 feet and was bottomed at 3,250 feet in sand. The bulk of production in the Jackson area is from lime.

Murchison & Closuit No. 2-A State, SE NW SW section 16-17-31, found pay at 3,076 feet, total depth 3,585 feet, and flowed 85 bbls. of oil daily through tubing.

Same operators' No. 1 Foster, SE NE SE section 17-17-31, flowed 75 bbls. of oil through tubing from pay topped at 3,036 feet, total depth 3,542 feet.

Repollo Oil Co. No. 2-C McIntyre, NE cor. section 20-17-30, topped pay at 3,082 feet, total depth 3,265 feet, and flowed 26 bbls. of oil in six hours through tubing.

W. K. Royalty Co. No. 2 State, C NW NE section 16-17-31, had pay at 3,217 feet, total depth 3,678 feet, and flowed 40 bbls. of oil daily through tubing.

Lea County

Addison Oil Co. No. 2 Knight, C SW NW sec. 27-24-37. Drlg. 1,370 ft.

Amerada Pet. Corp. No. 3 Laughlin, C NW NE sec. 9-20-37. T.D. 2,855 ft.; set 8-in. 2,573 ft.

Amerada Pet. Corp. No. 2 State VA, C NW SW sec. 23-17-34. Drlg. 3,790 ft.

Amerada Pet. Corp. No. 2-Q State, C W½ NE SE sec. 16-20-37. T.D. 3,788 ft., W.O.C.

Amerada Pet. Corp. No. 2 James Stuart, C W½ SW NW sec. 14-25-37. Drlg. 2,170 ft.

Anderson-Prichard Oil Corp. No. 2 Langlie, SE sec. 8-25-37. Drlg. 3,420 ft.

Anderson-Prichard Oil Corp. No. 4 Langlie, NE SW NE sec. 8-25-37. T.D. 3,477 ft.; F. 25 B.O.P.D.; tstg.

Anderson-Prichard Oil Corp. No. 1 Wells, C SE SE sec. 5-27-37. Drlg. 3,610 ft.

Anderson-Prichard Oil Corp. No. 2 Wells, C SW SE sec. 5-27-37. C.&P.

Atlantic Ref. Co. No. 1 State, C SE SW sec. 32-24-37. Drlg. 2,905 ft.

Cities Service Oil Co. No. 1-H State, C NE NE sec. 17-22-36. T.D. 3,884 ft.; prep. to deepen.

Continental Oil Co. No. 2-F-1 State, C SW NE sec. 1-21-36. Drlg. 3,635 ft.; 1,120,000 ft. gas at 3,614 ft.

Continental Oil Co. No. 1-J-2 State, C NW NE sec. 2-22-36. T.D. 3,590 ft.; W.O.C.; 500,000 ft. gas.

Continental Oil Co. No. 1-B-15 Britt, C W½ NW NW sec. 15-20-37. T.D. 3,865 ft.; no shows.

Continental Oil Co. No. 3 Jack, C SE NE sec. 20-24-37. M.I.M.

Continental Oil Co. No. 1-A-31 Marsh, SE sec. 31-20 39. Wildcat; T.D. 4,346 ft.; C.O.

Continental Oil Co. No. 5 Reed, C W½ NE SE sec. 23-20-36. Drlg. 3,345 ft.

Continental Oil Co. No. 2 Sanderson, NE NE SW sec. 14-20-36. Drlg. 1,610 ft.

Continental Oil Co. No. 9 Sanderson, NE SE NW sec. 14-20-36. T.D. 1,225 ft.; cmtg.

Continental Oil Co. No. 4-E-17 State, C SW NW sec. 17-22-36. T.D. 3,830 ft.; F. 21 B.O. in 9 hrs.; S.D.O.

Cranfill & Germany No. 1 Weir, C NE NE sec. 15-20-37. T.D. 4,210 ft.; S.D.O.

Culbertson & Irwin No. 4 Alston, SW SE NW sec. 26-25-37. T.D. 3,206 ft.; W.O.C.

Culbertson & Irwin No. 1 Dabbs, NE NE NW sec. 35-25-37. Drlg. 1,260 ft.

Culbertson & Irwin No. 3-A Humphrey, NE SW SE sec. 3-25-37. T.D. 3,430 ft.; pay 3,407 ft.; S.D.O.

Culbertson & Irwin No. 2 Liberty Royal, C N½ SW NW sec. 3-25-37. T.D. 3,467 ft.; rng. csg. to test.

Danglade & Clower No. 1 Glier, C SW NE sec. 32-22-37. T.D. 3,680 ft.; F. 30 B.O. in 13 hrs.; tstg.

L. E. Elliott No. 2 Elliott, NE NW SE sec. 26-20-36. T.D. 3,720 ft.; W.O.C.; est. 5,000,000 ft. gas.

A. R. Eppenauer No. 1 Stuart, NW NE NE sec. 22-25-37. T.D. 3,373 ft.; flwd. 15 B.O.P.H. at 3,321 ft.

J. E. Farrell No. 2-C Walden, C SE SW sec. 15-22-37. Drlg. 3,700 ft.

Great Western Prod. Co. No. 1-C State, C NE SW sec. 7-19-37. T.D. 175 ft.; S.D.R.

Gulf Oil Corp. No. 1 Alley, C NE SE sec. 10-23-37. T.D. 3,713 ft.; P.B. 3,686 ft.; S.D.O.

Gulf Oil Corp. No. 8-F Bell, C NW NW sec. 36-20-36. Drlg. 3,680 ft.; S.K. 3,540 ft.

Gulf Oil Corp. No. 1 Boyd, sec. 23-22-37. T.D. 3,681 ft.; tstg.

Gulf Oil Corp. No. 4 Day, C E½ SW NW sec. 6-22s-36. C.&P.

Gulf Oil Corp. No. 2-D Kutter, C SE SW sec. 8-19-37. T.D. T.D. 4,155 ft.; P.B. 4,100 ft.; S.D.O.

Gulf Oil Corp. No. 2 Ramsey, C SW SW sec. 27-21-36 T.D. 3,895 ft.; P.B. 3,871 ft.; swb. 289 B.F. 20 hrs.; 20% wtr.; S.D.O.

Humble O. & R. Co. No. 5 Fopeano, C E½ SW SE sec. 26-20-36. T.D. 3,855 ft.; acid.; tstg.

Humble O. & R. Co. No. 3-H State, C NW NW sec. 34-22-37. Drlg. 1,140 ft.

Humble O. & R. Co. No. 3 Williams, C SW NW sec. 34-24-37. T.D. 3,532 ft.

Jal Nat. Gas Corp. No. 2 Justis, NE sec. 20-25-37. T.D. 3,029 ft.; tstg.

Magnolia Pet. Co. No. 1 Brunson-Argo, C NW NE sec. 9-22-37. T.D. 3,590 ft.; drlg. plug.

Magnolia Pet. Co. No. 1 State G, NW NW NE sec. 34-17-34. T.D. 4,905 ft.; P.B. 4,794 ft.

Magnolia Pet. Co. No. 3-K State, C SE SE 31-17-35. T.D. 808 ft.; W.O.C.

Magnolia Pet. Co. No. 2 State-Bridges, sec. 14-17-34. T.D. 4,593 ft.; flwd. 51 B.O. in 1 hr. naturally.

Magnolia Pet. Co. No. 3 State-Bridges, C NE NW sec. 26-17-34. Drlg. 2,220 ft.

Magnolia Pet. Co. No. 6 State-Bridges, C SW NW sec. 23-17-34. T.D. 4,755 ft.; pay 4,618 ft.; to test.

Magnolia Pet. Co. No. 7 State-Bridges, C SW NE sec. 23-17-34. Drlg. 3,160 ft.

Magnolia Pet. Co. No. 8 State-Bridges, C NW SE sec. 23-14-34. Drlg. 3,480 ft.

Maljamar O. & G. Co. No. 9 Baish, C NW NW sec. 21-17-32. Drlg. 2,880 ft.; S.O. 2,580 ft.

Maljamar O. & G. Co. No. 4 Mitchell, C NE NE sec. 20-17-32. T.D. 905 ft.; drlg. plug.

Maljamar O. & G. Co. No. 5 Mitchell, C NW NW sec. 19-17-32. Drlg. 992 ft.

Jas. A. Mascho No. 2 Cloyd, C SW SW sec. 20-22-33. Loc.

C. T. McLaughlin No. 1 Polhamus, NE sec. 9-24-37. T.D. 3,672 ft.; S.D.O.

National Drlg. & Prod. Co. No. 1 Flint, C NE NE sec. 29-20-34. Wildcat; drlg. 3,710 ft.

Ohio Oil Co. No. 1 Kutter D, C SW SW sec. 18-19-37. Drlg. 3,625 ft.

Ohio Oil Co. No. 1 State-Fleming, NE cor. sec. 2-26-37 T.D. 1,248 ft.; cmtg.

Ohio Oil Co. No. 7 State-McDonald, C SW SE sec. 16-22-36. T.D. 3,871 ft.; C.O.

Ohio Oil Co. No. 2 State-Warn, C NE SW sec. 31-17-35. T.D. 4,109 ft.; W.O.C.

Parker Drlg. Co. No. 2 Irwin, C W½ NW SW sec. 35-24s-37. Drlg. 725 ft.

Paton Bros. No. 2 Wilkinson, C SE SE sec. 8-18-31. Loc.

Lem Peters No. 1 L. J. May, C NW SE sec. 27-22-37. Rng. sg. 3,360 ft.

Lem Peters No. 1 T. O. May, C NW NE sec. 34-22s-37. Drlg. 1,145 ft.

Phillips Pet. Co. No. 3 Santa Fe, C SW NW sec. 5-18-35. Rig.

Phillips Pet. Co. No. 4 Santa Fe, C SW SE sec. 31-17-35. Drlg. 3,235 ft.

Phillips Pet. Co. No. 5 Santa Fe, C NW SW sec. 31-17-35. Drlg. 3,230 ft.

Phillips Pet. Co. No. 6 Santa Fe, C SW SE sec. 21-17-35. Drlg. 3,411 ft.

Plains Prod. Co. No. 1 Humphreys, NE sec. 3-25-37. Loc.

Repollo Oil Co. No. 2 Hair, NW SW NW sec. 9-24-37. Drlg. 1,500 ft.

Repollo Oil Co. No. 1 State, SE cor. sec. 6-17-34. Drlg. 4,682 ft.; swbg. 22 B.O.P.D. while drlg.

Repollo Oil Co. No. 4-B Whitten, NE NE SE sec. 4-24-36. T.D. 3,650 ft.; F. 60 B.O. in 4 hrs.; tstg.

Republic Prod. Co. No. 1 State, C NW SW sec. 32-17-35. Drk.

Rowan & Nichols No. 1 State, C NE NW sec. 22-10-37. T.D. 831 ft.; S.D.R.

J. M. Rush No. 2 Wantz, C NW SW sec. 21-21-37. T.D. 160 ft.; W.O.C.

Harry J. Schafer No. 1-A State, C E½ NW NE sec. 26-20-36. T.D. 3,865 ft.; swb. some oil; P.B. 3,845 ft.; retreated and swb. 10 B.O.P.D.; treated and swbg.; no gauges.

Shasta Oil Co. No. 2 Woolworth, NE NW NW sec. 28-24-37. T.D. 3,048 ft.; drlg. by tools at 2,974 ft.

Shell Pet. Corp. No. 4-E State, C SW NW sec. 12-20-36. Drlg. 3,800 ft.

Skelly Oil Co. No. 5 J. B. Baker, C SE NW sec. 27-22-37. T.D. 3,620 ft.; tstg.

Skelly Oil Co. No. 3 G. W. Sims, C NW NE sec. 9-23-37. T.D. 3,642 ft.; C.O.

Skelly Oil Co. No. 1-C R. R. Sims, sec. 3-23-37. Drlg. 3,688 ft.

Skelly Oil Co. No. 1-E W. P. Sims, C NW NE sec. 10-23-37. T.D. 3,625 ft.; flwd. 452 bbls. in 24 hrs.

Skelly Oil Co. No. 1-L State, C SW NW sec. 2-25-37. Drlg. 2,250 ft.

Stanolind O. & G. Co. No. 2-A Hill, C SE NE sec. 6-21-37. Drlg. 3,677 ft.

Stanolind O. & G. Co. No. 3-B Farnsworth, C E½ NE SW sec. 7-26-37. Loc.

Stanolind O. & G. Co. No. 5-B Myers, C NE SW sec. 9-24-37. Drlg. 3,105 ft.

W. H. Street No. 4 Woods, C NE NE sec. 22-22-37. Drlg. 3,550 ft.; S.S.O.&G.

W. H. Street No. 2 Farrell, C NW SE sec. 22-22s-37. Drlg. 1,235 ft.

Texas Co. No. 3 Black, C NW NE sec. 21-24-37. Drlg. 2,220 ft.

Texas Co. No. 2 Cagle, SE NE NE sec. 9-26s-37. Loc.

Texas Co. No. 1 Corbin, C NW SW sec. 19-18-33. T.D. 5,118 ft.; P.B. 5,112 ft.; W.O. new tools.

Texas Co. No. 4 Fristoe, NW NE SE sec. 3-25-37. T.D. 3,217 ft.; W.O.C.

Texas Co. No. 3 J. S. Lea, NE NE SW sec. 14-20-34. Loc.

Texas Co. No. 1-N State, C SW SW sec. 30-17-35. C.O. to 4,747 ft.; to test.

Texas Co. No. 3-O State, C SW NE sec. 36-17-34. Drlg. 3,900 ft.

Texas Co. No. 1-P State, C NW SE sec. 7-18-35. Drlg. 3,600 ft.

Texas Co. No. 1-Q State, C SE SE sec. 25-17-34. C.&P.

Texas Co. No. 2-Q State, C SW SE sec. 25-17-34. R.U.R.

Texas Pacific C. & O. Co. No. 12-A State, C NE SE sec. 7-22-36. Drlg. 3,350 ft.

Twin Drlg. Co. No. 1 Corrigan, C SW NE sec. 4-22-37. M.I.M.

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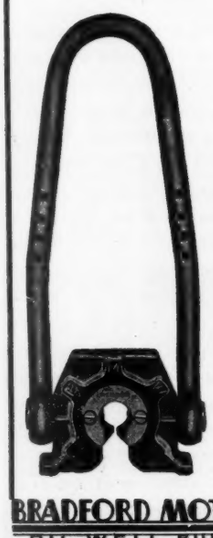

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Twin Drlg. Co. No. 1 State, C SE NW sec. 32-21-37. Drlg. 835 ft.
Two States Oil Co. No. 2 Cole, O.W.D.D., C NE NE sec. 16-22-37. O.T.D. 1,141 ft.; R.U.S.T.
Two States Oil Co. No. 4 Cole, C NW NW sec. 16-22-37. Drlg. 150 ft.
Weler Drlg. Co. et al No. 1 Woolworth, NE NE SW sec. 28-24-17. Drlg. 930 ft.
Ted Weiner No. 1 Smith, NE cor. sec. 4-25-37. Drlg. 2,945 ft.
Weiner No. 1 Parcell, C SW NE sec. 8-23-28. Drlg. 2,350 ft.
Western Gas Co. No. 1 Curry, C SE SE sec. 1-24-36. T.D. 3,697 ft.; to test; S.O.&G.
Western Gas Co. No. 1 Matkins, C SE SE sec. 15-23-36. T.D. 3,665 ft.; P.B. 3,658 ft.; tested 32,000 ft. of gas. to C.O.

NORTHWEST NEW MEXICO

Bernalillo County

Norins Realty Co., Inc., No. 2 North Albuquerque, NE SE NW sec. 19-11n-4e. T.D. 3,750 ft.; M.I. 6⅝-in. and 3-in. D.P.; to resume.

San Juan County

Continental Oil Co. No. 75 Rattlesnake, E¼ cor. sec. 2-29-19w. Drlg. 815 ft.
Al Greer No. 2 fee, SW SE SW sec. 10-30n-11w. Drlg. 475 ft.
Frank Lischke No. 1 Abreo, SW SW sec. 27-30n-11w. Drlg. below 520 ft.
Anna Oil Corp. No. 6 Govt., SW NE NE sec. 33-30n-11w. Drlg. 1,900 ft.

COLORADO

Archuleta County

An unverified report, but coming from what is considered a reliable source, says that the Pagosa Oil & Development Corp. No. 1 Macht, C section 32-36n-1w, on the Pagosa dome, scratched a saturated sand at around 1,100 feet and that the hole is standing full of oil. Immediately upon running into the show operations were suspended and a string of 8¼-inch casing and a control head were ordered from Denver. These supplies were shipped out of Denver five days ago by truck and have been delivered at the well. This test is located about 15 miles to the northwest of the William E. Hughes estate's Gramps pool, which was tested, developed and put on production in 1936 and 1937. The Pagosa well began drilling last summer with the Dakota as the objective. The 12½-inch was set at 328 feet and the 10-inch at 675 feet.

This district, which usually is dormant during the winter on account of heavy snows, again is becoming active and four or five wells are scheduled to be started within the next month or two, of which two will be across the line in northern New Mexico.

The first new operation of the year has been released for a test on the Boone dome, about 12 miles west and north of the Gramps field and between the last named and the Pagosa dome test. It will be drilled by the Boone Development Co. on the Whitney Newton tract in the SE NW SE section 18-33n-1e. Equipment and a No. 30 Star machine are now moving in for a Dakota well. That horizon is expected at around 1,850 feet. D. W. McGee, of Denver, is president of the new company; L. D. Davidson is vice president, and George A. Bewley is secretary and treasurer. The structure covers about 6,000 acres, of which 5,000 acres are held by the company. It is all government land except that Whitney Newton, of Pueblo, has the mineral rights on 1,680 acres. The Newton interests formerly held the acreage under timber rights, but when the cutting was finished the land was deeded back to the government, except that the mineral rights were reserved.

Boone Dev. Co. No. 1 Newton, SE NW SE sec. 18-33n-1e. M.I.M. (first report).
Pagosa Oil & Dev. Co. No. 1 Macht, S sec. 32-36n-1w. S.D. 1,100 (?) ft. for csg.

Cheyenne County

Gulf Oil Corp. No. 1 Union Pacific-Larsen, C SE NW sec. 13-13s-49w. Cg: 6,114 ft. in brown crystalline dolomite (Arbuckle L.). Core shows good porosity, but no oil.

Fremont County

Stanley Thomas No. 1 Rickwalt, SE SE sec. 2-19s-70w. Drlg. below 60 ft.

Garfield County

Roaring Fork Oil Co. No. 1 Patterson, C NE sec. 36-7s-88w. Recmtg. 8¾-in. at 721 ft.

Grand County

Interstate Oil & Ref. Co. No. 1 Hinman, NE SE NW sec. 11-2n-81w. T.D. 3,830 ft.; landed 4¾-in. on bttm.; drlg. ahead.

Huerfano County

S. W. Pressey No. 1 Tomkins, NE NE NE sec. 10-29s-69w. M.I.M.
S. W. Pressey No. 2 Alamo, C SW SE sec. 3-27s-68w. Rng. 8¼-in. at 1,200 ft.

LaPlata County

N. Spatter No. 1-X Bryce, SE SW SW sec. 31-33n-9w. Skdg. rig from No. 1.

Mesa County

Continental Oil Co. et al No. 1 Miller, SW SW NW sec. 36-8s-91w. Drlg. 1,850 ft. in sd.; sh. and shells.

Moffat County

C. R. Privett No. 1 Sutton, a test on the Dry Lake structure 15 miles northwest of the Iles field, began spudding May 15 for a Sundance test. Location for this well was released last November, but drilling was delayed until blocking of leases could be completed. It is being drilled with standard equipment and cable tools. First objective is expected at around 1,500 feet.

C. R. Privett No. 1 Sutton, NE NE SW sec. 1-5n-96w. Spdg.
Morapas Pet. Co. No. 1 Coles, SW SW SE sec. 1-3n-92w. T.D. 2,658 ft.; preparing to resume.

Park County

South Park Oil Co. No. 1 Lemar, NE NE SE sec. 34-11s-75w. T.D. 5,735 ft.; C.O. to res.

Prowers County

Continental Oil Co. No. 1 Ruby, C NE NW sec. 31-21s-44w. Cmtd. 20-in. at 60 ft.; drlg. W.W.

Pueblo County

C. E. Puckett No. 1 Barber, NW sec. 35-21s-66w. Res. at 280 ft.

Routt County

Craig & Moore No. 1 Erwin, C SW NE sec. 33-7n-85w. T.D. 650 ft.; strtng. cr. hole.

WYOMING

Albany County

Murphy Oil Co. No. 12 Holst, SE NW NE sec. 13-17n-77w. Drlg. below 215 ft.
Murphy Oil Co. No. 13 Holst, SE SW NE sec. 13-17n-77w. Loc.

Big Horn County

Prescott & Mileski No. 1 Govt., NE NW SW sec. 15-1n-93w. Drlg. 536 ft.
Clifford S. Johnson No. 1 Johnson, CEL NW NW sec. 24-51n-93w. Rig; W.O. engine.
Joan Oil Co. No. 1 Howell, NE NW NE sec. 32-55n-97w. S.D. 3,385 ft.

Carbon County

Cunningham Oil Co., Inc., No. 1 Union Pacific-Cronberg, SE NE SE sec. 3-23n-79w. Spdg.
Producers Oil Co. No. 1 Lake Valley, 200 ft. S of CNL sec. 14-20n-88w. Res. drlg. 1,755 ft.; 12½-in. at 1,588 ft.
Ohio Oil Co. No. 3 Hazlett Est., NE SW SE sec. 34-23n-79w. Drlg. 2,161 ft.
Ohio Oil Co.-California Co. No. 3 State-Griffin, C SW NW sec. 36-21n-79w. Drlg. 2,644 ft.

Converse County

New Era Fuel Co. No. 1 Boot Cattle, CSL SE SE sec. 1-31n-70w. S.D. 540 ft.; through White River.
E. B. Jones No. 1 O'Meara-Govt., NW SE NE sec. 17-32n-69w. Spdg.
Wyshawn Oil Co. No. 1 Lindley, NW SE SE sec. 34-32n-69w. Drlg. 900 ft.

Fremont County

Consolidated Oil Properties No. 3 Ewart, C SW SE sec. 16-1n-1w. Drlg. 820 ft.
Sinclair-Wyoming Oil Co. No. 2-B Muskrat, NW NW NE sec. 4-33-92w. Drlg. 5,151 ft. in Mowry sh.
Stanolind O. & G. Co. No. 1 Govt., C SE SE sec. 3-33n-96w. T.D. 8,920 ft.; cmtd. 7-in. liner at 7,387-8,915 ft. with 205 sacks; perf. liner at 8,230-85; prep. to tst.
Ben Stewart No. 1 Darnell, NE SE sec. 26-3n-1w. Drlg. 1,910 ft.

Hot Springs County

California Exploration Co. No. 1 Govt., NE SE NE sec. 12-44n-97w. Drlg. 4,070 ft.

Lincoln County

H. C. Harris et al No. 1 Govt., SE NW NW sec. 23-21n-117w. Drlg. 442 ft.

Natrona County

General Petroleum Corp.'s discovery well on the Cole Creek structure showed for 57 bbls. per hour on a drill stem test from the Lakota at 7,978½-8,019 feet before running pipe. The 6⅝-inch was cemented at 7,978 feet and plug will be drilled for a production test within the next day or two. The drill stem test showed gas increased and well is expected to be better than first estimated. Following the test, decision will be made whether the hole will be carried on down to the Sundance.

Stanolind Oil & Gas Co. No. 26 Wyoming Associated T. P., in the Salt Creek field, topped the Tensleep at 3,813 feet. A drill stem test at 3,903 feet showed 102 bbls. in one hour. Hole was drilled to 4,002 feet and 6⅝-inch was cemented at 3,996 feet. Casing will be perforated at 10-foot intervals from bottom up, and tested after each perforation.

Stanolind O. & G. Co. No. 26 T.P.-Wyo. Asso., C SE SW sec. 26-40n-79w. C.&P.
Western Producers, Inc., No. 1 Govt., NW SW SE sec. 5-39n-78w. S.D. 1,165 ft.
Stanolind O. & G. Co. No. 8 T.P.-Midwest Oil, C NW SW sec. 35-40n-79w. Loc.; W.O. compl. No. 26.
Stanolind O. & G. Co. No. 26 T.P.-Wyo. Asso., C SE NW. Sec. 35-40n-79w. T.D. 4,002 ft.; prep. to test.
General Pet. Corp. No. 1 Govt., C NW SE sec. 21-35n-77w. T.D. 8,019 ft.; cmtd. 6⅝-in. at 7,978 ft.; W.O.C.

Niobrara County

Continental Oil Co. No. 12 Tom Bell, C SE SE sec. 33-36n-65w. T.D. 4,004 ft.; top basal Sundance 3,932 ft.; 7-in. 3,947 ft.; W.O.C.
A. B. Cobb et al No. 3 Novick-Ong, SW SE SW sec. 6-35n-65w. T.D. 5,315 ft. in Leo sd.; rng. 7-in.
MacKinnie Oil & Drlg. Co. No. 3 Thompson, NW NE NW sec. 7-35n-65w. T.D. 5,212 ft.; will drill by.
Minnelusa Oil Co. No. 2 H. & M., NW NE NE sec. 8-35n-65w. S.D.O. 325 ft. after cmtg. 13⅜-in.
Continental Oil Co. No. 11 Tom Bell Cattle, SE SW SW sec. 27-36n-65w. T.D. 5,415 ft. in sat. and L.; rng. tbg. to acid.
Hewitt Bros. and Manning No. 1 Pecklow, SE SE SE sec. 1-35n-66w. Drlg. below 5,160 ft.
Ohio Oil Co. No. 10 Putnam, NW SE NW sec. 4-35n-65w. T.D. 5,473 ft.; cmtd. 7-in. 5,396 ft.; flowing 31 B.P.H. while C.O.
H. D. Moore et al No. 1 Beregren, NW sesc. 23-35n-63w. Drlg. in Sundance 937 ft.; top Morrison 587 ft.
Continental Oil Co. No. 4 Apex-2, NW NE SE sec. 34-36n-65w. Rng. drk. found. (first report).

Park County

The Resolute Oil Co. No. 4 Northern Pacific, C NE NW section 21-57n-101w, in the Badger Basin field, which has been standing at 8,670 feet after a shot with 40 quarts in the Frontier at 8,625-54 feet since last February, has been listed as a completion for 4 bbls. per day. It may be deepened at a later date.

Paul Stock No. 1 Govt., SE SE NE sec. 20-53n-101w. Drlg. 2,305 ft.

Sublet County

Yellowstone Oil Co. No. 1 Henry Budd, C SE SE sec. 6-30n-112w. Drlg. 100 ft.; (not Major O. D. Co.)
Wyoming Pet. Corp. No. 1 Chas. Budd, C NE NE sec. 10-29n-113w. Spdg.; (deep test to 5,000 ft.).

Sweetwater County

Sinclair-Wyoming Co. No. 78, SW SW NW sec. 11-26n-90w. Drlg. 3,863 ft.; top Embar L. 3,790 ft.
Selegna Oil Co. No. 1 Union Pacific, SW SW sec. 11-20n-104w. Drlg. 4,406 ft. in lower Morrison.

Washakie County

Wyoming O. & R. Co. No. 10-B Brome, C SE NE sec. 6-47n-90w. Drlg. below 1,500 ft.

Weston County

Two completions and one new operation were reported in the Osage field. Bert Higgins No. 5, CNL NW SW section 4-46n-63w, made 2½ bbls. per day on the pump from sandy shale at 301 feet, and Charles Stough No. 11, CSL SW NW section 4-46n-63w, made 5 bbls. per day at 301 feet.

Updike Bros. No. 6, CSL NE SW sec. 25-46n-64w. R.U.
Osage Trust Co. No. 30, NE NW SW sec. 14-46n-64w. Drlg. below 1,500 ft.
John Brorphy No. 1 George, SW SE NW sec. 26-48n-64w. T.D. 2,040 ft.; tstg. W.S.O.

MONTANA

Carbon County

R. C. Tarrant No. 1, 500 ft. W of C sec. 3-6s-18e. Drlg. 1,825 ft.
R. C. Tarrant No. 2 Heare, NW SE NW sec. 14-6s-19e. S.D. 1,780 ft.; chg. to rot.
Sha-Wa Pet. Co. No. 1 Govt., SW SW NE sec. 35-9s-23e. Drld. cmt. plug to 3,055 ft. and hole began filling with W.; pulling 8⅝-in.
Miracle Oil Co. No. 2 Govt., CWL NE SE sec. 3-6s-23e. S.D. 2,381 ft.

Fergus County

Baughman & Singley No. 1 Skaggs, C NW SW sec. 7-15n-20e. Drlg. 650 ft.

Glacier County

A development of considerable importance took place to the north of the Cut Bank gas field when A. B. Cobb No. 1 State, C NE NE section 30-37n-4w, was deepened 13 feet and picked up a second sand which gauged 40,000,000 feet of gas. It is not only the largest gas well ever completed in Cut Bank, but extends the proven area 5 miles to the northeast and shows for a record producer in the lower Moulton sand.

The well was drilled to 2,595 feet last December and gauged 8,000,000 feet a day from the Moulton sand at 2,572-85 feet. The 7-inch was cemented at 2,281 feet and the well was shut in for the winter. The past week operations were resumed. The drill cut a sandstone at 2,595-97 feet when the gas increased rapidly and gauged 24,000,000 feet. It was then deepened to 2,605 feet through 8 additional feet of sand where it gauged 40,000,000 feet. The second sand correlates with the basal Moulton sand found in the Glacier Production Co.'s Reynolds and McNamar unit wells 5 miles to the southwest. The Cobb well did not drill deep enough to be in the Sunburst sand. After testing it was shut in indefinitely.

The Cobb well is located about midway between the Border field on the Canadian boundary and the Cut Bank gas field. The nearest gas well is the Glacier Production Co. No. 1 McNamar Unit, CEL SE SE section 15-36n-5w, 5 miles to the southwest, which was completed in April for 17,000,000 feet, having found the gas in two sands now identified as the Upper and Lower Moulton. The Moulton sand in the field ordinarily is a much smaller producing horizon than the Cut Bank, which with the Sunburst, lie below the Moulton in the base of the Colorado shale.

A. B. Cobb No. 1 Reagan-Jackson, SW SE NW sec. 5-32n-5w. R.U.
Nadeau Bros. No. 5 Farmers State Bank, CEL SE NE sec. 17-33n-5w. Drlg. 2,855 ft.
Glacier Prod. Co. No. 2 Eisler, SW NE SW sec. 5-33n-5w. Cmtd. 7-in. at 2,768 ft.; top Cut Bank 3,765.
K. D. Pardee No. 1 Drumheller, NE NW (C Lot 3), sec. 2-33n-6w. Drlg. 2,985 ft.
A. B. Cobb No. 1 State, C NE NE sec. 30-37n-4w. T.D. 2,592 ft.; S.D. until spring.

Hill County

Walter Drought No. 1 Stranshan, SW SE SW sec. 12-34n-17e. Spd. to 25 ft. and S.D.

Lewis and Clark County

Lewis & Clark Oil Synd. No. 1 Heilman, NW SW SW sec. 11-18n-5w. S.D. indef. 3,140 ft.

Park County

Ben W. Ryan No. 1 Burgee, SE SW NW sec. 28-2s-11e. Drlg. 1,278 ft.

Toole County

There was a good completion in the Gunderson pool on the west side of the Kevin-Sunburst field in B. A. S. Aronow No. 2 Government, SW SE SW section 18-35n-2w, which is pumping and flowing 200 bbls. per day from the contact at 1,646 feet. It is not showing any water and apparently is producing from a fissure as its offset on the east made only 60 bbls. per day initially with some water.

Bryant Brothers No. 1 Lashbaugh, NE SW NW section 34-35n-2w, is abandoned at 850 feet.

V. F. Dahl No. 1 Kimball, SW SE SE sec. 1-35n-3w. Spdg. 40 ft. (first report).
Big West Oil Co. No. 8 Gunderson, CNL NE NW sec. 19-35n-2w. Drlg. 450 ft. (first report).
Kluth & Burke No. 1 George, SE SW SE sec. 8-34n-2w. Drlg. 575 ft.
A. E. Crumley No. 11 Fryberger, C NW SE sec. 24-35n-3w. Drlg. 1,560 ft.
O. A. Nepstad No. 2 Haugen, NW NW NE sec. 11-35n-3w. Drlg. 1,225 ft.
Hamilton & Hamilton No. 4 Reeg, SE SW SE sec. 14-35n-2w. Drlg. 1,200 ft.
Boris A. S. Aronow No. 2 Govt., SW SE SW sec. 18-35n-2w. T.D. 1,646 ft.; tstg.
Fifty-Six Pet. Co. No. 1 Keywood, C NW SW sec. 13-34n-4w. Drlg. 1,410 ft.
A. Beardslee No. 8 Swears, SE NW NW sec. 9-35n-2w. Drlg. 1,460 ft.
Rimrock Oil Co. No. 4 Schmidt, CSL SW NW sec. 29-35n-3w. T.D. 1,800 ft.; contract 1,794 ft.; acd. 500 gal.; tstg.
Pfabe & Engelking No. 2 Hurley, NE NE NW sec. 8-34n-2w. Loc.
Deloraine Oil Synd. No. 3 Solberg, SE SW NE sec. 29-35n-3w. T.D. 1,760 ft.; acd. second time, 750 gal.
H. C. Morton No. 8 Morton, C SW NW sec. 24-34-2w. S.D. 590 ft.
Chas. Grant et al No. 1 Anderson, SE NE NE sec. 26-35n-4w. S.D. 2,109 ft.
West Kevin Community Lease, Inc., No. 1 McClary, SW NE NW sec. 3-34n-4w. T.D. 2,160 ft.; 100 ft. oil; may acd.

Yellowstone County

Broadview Dome Oil Co. No. 1 Stallinberger, NE NE SW sec. 18-3n-23e. S.D. 4,565 ft.
Riverton Oil Co. No. 1 Fox, CEL NW NE sec. 14-2n-23e. T.D. 1,795 ft.; cmtd. 8¼-in. on bttm.; R.U.S.T.
R. C. Tarrant No. 3 Sayre, SE NE SW sec. 26-3s-4e. Drlg. 750 ft.

UTAH

Daggett County

Mountain Fuel Supply Co. No. 3-B Murphy, NW NW SW sec. 23-3n-24e. Drlg. 4,301 ft.

Grand County

Utah Southern Oil Co. No. 1 Hyde, SE NW NW sec. 33-22s-22e. T.D. 6,715 ft.
Columbia Crude Corp. No. 1 Rath, NW SW SE sec. 12-25s-20e. T.D. 3,992 ft.; fsg.

(Continued on Page 111)

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Southwest Texas District

By
F. L. SINGLETON

Widely Separated Wildcats Yielding Indications of Oil

CORPUS CHRISTI, Tex., May 23. — Interest in the Southwest Texas district was centered on widely scattered areas where several wildcats have indicated new pools. In the Corpus Christi area, sand showing oil was logged in a wildcat in Redfish Bay off Aransas County, and casing was being cemented. A wildcat 5 miles east of the newly opened South Alice field, Jim Wells County, logged showings of oil and gas, and a drill-stem test was being made, and in the White Point gas field, San Patricio County, the first oil production was believed to have been opened. In the Laredo district, a production test was being made on a probable pool opener in Duval County, while in Starr County another such test was showing for a producer. Along the Balcones fault line, the wildcat south of Rockdale, Burleson County, continued to be tested.

Coastline Oil Co. No. 1 State, 2 miles southeast of Aransas Pass, in Redfish Bay, was reported to have ordered casing for a completion test after a Schlumberger survey showed possible oil sand at 7,338-56 feet. The hole is bottomed at 7,920 feet, and side wall cores made of the sand section had poor recovery, but showed oil sand. This is the first wildcat to be drilled in the coastal waters in the Lower Gulf Coast area and the showing is expected to lead to early development of other prospects that have been found along the coast line.

Humble Oil & Refining Co. No. 1 Tarrant, 5 miles east of the South Alice field, Jim Wells County, made a 20-minute drill-stem test at 3,628-35 feet and found no pressure and recovered 750 feet of muddy water with a slight cut of oil and a color of oil, with no taste of salt water. At 3,635-36 feet, 2 inches of shale and 6 inches of shaly sand with a slight color was recovered. From 3,636-38 feet, 1 foot of firm, soft sand with a slight odor was recovered and the company was preparing for a drill-stem test. The significance of the showing is that this is the top of the Frio section which is logged in the South Alice field and which carries gas. The showing gives the well an excellent chance of producing in the basal Frio section, which produces at South Alice.

South Alice Field

The first well to core the discovery horizon in the South Alice field is Walter Goldston No. 1 Reed and Lindsay, an east offset to the discovery well, and the prospects of its producing in the section are not encouraging. Hard sandy shale with an odor of oil was logged at 5,345-56 feet, and soft shaly sand, with no odor, at 5,366-70 feet. A 10-minute drill-stem test of the section showed 3,500 feet of salt water. The discovery well was completed at 5,375-85 feet, and the well cannot be classified as a failure until it cores the complete section. Should it fail to find saturation after coring deeper, casing is expected to be cemented, for completion in a new sand section at 5,144-52 feet, where it showed distillate and 600 pounds of working pressure on a three-minute drill-stem test. West of the discovery, H. H. Howell No. 1 Lindsay and Reed is coring below 5,346 feet and should reach the sand within a few hours. A Schlumberger survey at 5,363 feet showed sand from 5,346 feet, but it carried salt water. The six other tests in the field are drilling ahead and the majority of them should reach the pay some time this week.

Oil in White Point Gas Field

J. K. Culton No. 1 White Point Development Co. is believed to have opened the first oil production for the White Point gas field, San Patricio County, as it is cleaning into the pits through a 5/32-inch choke, showing oil and wash water with no evidence of salt water. While cleaning, it has a tubing pressure of 150 pounds and 950 pounds on the casing. Final completion was made after an 18-minute drill-stem test through perforated casing at 4,925-35 feet, recovered 11 thribbles of oil and 250 pounds of pressure. Sand showing gas was topped at 4,898 feet and oil sand at 4,910-61 feet. Highly charged shallow gas sand, due to several blowouts in the field, have prevented this field from receiving its share of development.

Two producers were completed in the rapidly spreading East White Point field, San Patricio County, which is being developed by the Plymouth Oil Co. No. 2 Kellogg, flowed 174.54 bbls. per day through a one-eighth-inch choke from perforation at 5,661-65 feet. Location is in section 62. No. 2 Nelson, in the same section, perforated casing at 5,673¼-77 feet and flowed 192 bbls. daily through a one-eighth-inch choke. Northeast of the field, Atlantic Refining Co. is preparing to spud No. 1 D. F. Jones in the SW quarter of section 72.

The third horizon for the Luby field, Nueces County, was established by the completion of Seaboard Oil Corp. No. 23 James Luby. Perforations were made at 7,171-74 feet and the well flowed 145 bbls. daily through a one-eighth-inch choke. This sand has been cored in several wells, but this is the first completion in that horizon.

South of Robstown, Nueces County, Mills Bennett Production Co. No. 1 Talley, section 10, George Paul subdivision, is coring below 6,893 feet after a six-minute drill-stem test at 6,860-73 feet, showed no pressure and 100 feet of mud, cut with salt water, bearing a slight show of oil. Hard cap was cored at 6,858-71 feet; hard sand, having an oil odor, was logged at 6,871-72 feet, and soft sand, with an oil odor, at 6,872-73 feet. The well is believed to be in the Frio section.

New Sand in Refugio

A new sand for the old Refugio field, Refugio County, was opened by the recompletion of South Oil Co. No. 1-A Ryals. The well was originally completed in the 6,700-foot zone and was plugged back and completed in the 6,500-foot zone for an estimated production of 45 bbls. of oil per hour through an eighth-inch choke with 800 pounds tubing pressure and 1,800 pounds casing pressure. This section has been logged in several of the wells, but no completion was attempted, as the section was thought to have carried distillate.

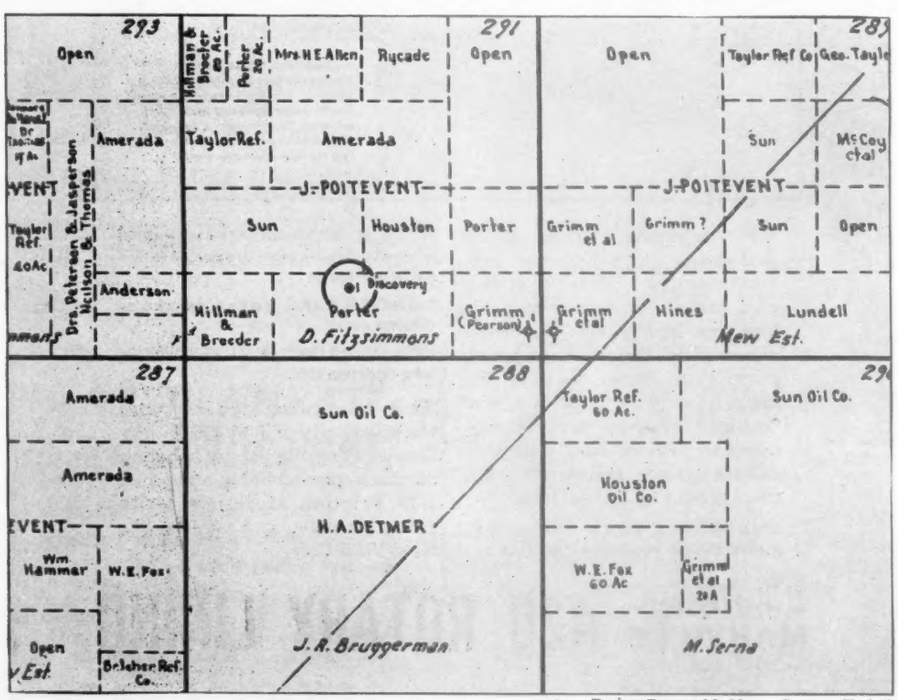
Northwest of San Diego, Duval County, H. J. Porter was preparing to test No. 1 Fitzsimmons, which is expected to open the Laredo district's second Cockfield sand pool. The hole is bottomed at 4,303 feet and 7-inch casing was cemented at 4,292 feet, following a drill-stem test last week which showed 450 feet of 45-gravity oil at 4,302-15 feet. The well is located in the J. Poitevent Survey 291, The block is divided into many ownerships and an active drilling campaign is expected should the well make a good producer.

In Jim Hogg County, Humble Oil & Refining Co. No. 1 Kelsey Bass, San Rafel grant, has attracted attention as oil and gas showings have been logged. Gas sand was logged at 4,127-30 feet; oil sand at 4,279-88 feet, and sand with no showing at 4,288-91 feet. A 25-minute drill-stem test was attempted at 4,271-88 feet, but the seat slipped to 4,273 feet and 30 feet of drilling mud and a slight odor of gas was recovered. A 30-minute test at 4,273-88 feet recovered 30 feet of drilling mud and 10 feet of salt water with no pressure. The well is coring ahead below 4,329 feet. It is located on a large block recently acquired.

Barbacoas Outpost Produces

Approximately 4 miles north of the Barbacoas field, Starr County, Henshaw & Davis No. 1 M. M. Garcia has opened a field, or an important extension to Barbacoas. The well is flowing 1½ bbls. of oil per hour through a one-eighth-inch choke from perforated casing at 2,662-69 feet. Several wells in the Barbacoas field produce from this horizon.

(Continued on Page 111)



Porter Regenold, Maps, Corpus Christi

H. J. Porter No. 1 D. Fitzsimmon, Duval County, which has apparently opened Laredo district's second Pettus sand field

How a Soil Analysis Survey Gives a Subsurface Picture

Present in oil producing formations (sands, limes and serpentine asbestos) are certain hydrocarbons which work their way to the surface soil. These chemical substances follow somewhat the paths of least resistance made by faulting, folding and other processes of nature that weaken the hard upper formations. They also come through in lesser intensity where the upper beds have been disturbed only slightly, or not at all.

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PETROLEUM BUILDING FORT WORTH, TEXAS

West, Central and Panhandle Texas

By MITCHELL TUCKER

New Pools in Permian Basin, Haskell and Callahan Areas

FORT WORTH, Tex., May 23.—New oil fields in Cochran and Crane counties of western Texas, and Haskell and Callahan counties of West Central Texas, together with important extensions to several other producing areas, headed developments in the busy week just closed.

In the Permian Basin area 43 new locations were staked, all but one being for further development of proven areas. Oil wells completed increased to 51 as compared with 39 for the previous week.

North Permian Basin

Cochran County, the northernmost producing county in the Permian Basin, was given its third producing field last week. The field opener is in the extreme southeast corner of the county, about 6 miles southeast of the eight-well Duggan field, and is Texas Co. No. 1 Mallett, section 7, Block G. Location is also about 8 miles west of the Slaughter pool in southern Hockley County. At its present total depth of 5,085 feet, plugged back from 5,122 feet to shut off water, the saturated lime was acidized with 2,000 gallons and reacidized with 3,000 gallons. After a few short heads were made, swabbing was resorted to in establishing continuous production. The first hour by swabbing gauged 35 bbls. of oil, and testing continues.

The 8,012-foot wildcat test in southwestern Andrews County continues to remain a center of interest. Frank S. Perkins and others No. 1 E. P. Cowden is preparing to run 5-inch casing on bottom, and perforate and acidize in zones showing attractive possibilities on Schlumberger survey. Black shale, thought to be of a Lower Permian age, was topped at 7,810 feet, and hole was still in this formation at its present record depth below 8,000 feet.

Also in southern Andrews County, about 4 miles north of the North Cowden field in Ector County, Rogers and Rogers No. 1 O. B. Hold was finally given an official gauge of 253 bbls. of oil, with 10 per cent water, by pumping. This new field opener is located in section D, Block 43, P.S.L. Survey. Total depth is 4,541 feet in saturated lime, topped at 4,470 feet.

In southwestern Gaines County, Eastland Oil Co. No. 1 P. C. Dunbar is in the completion stage and presents some promise of opening a new producing spot. Eight feet of saturated lime was recovered from 4,622 to 4,640 feet, and irregular saturation had been cored at intervals up the hole to 4,560 feet. At present, efforts are being made to shut off upper water coming into the hole through damaged 7-inch casing.

South Basin Territory

A new producing field in eastern Crane County, about 3 miles northwest of the Church-Fields area, was assured last week. Magnolia Petroleum Co. No. 1 University, section 16, Block 30, University lands, pumped 52 bbls. initially from pay at 3,264-3,325 feet.

As a 1-mile southeastern extension to the Tubb area of western Crane County, Humble Oil & Refining Co. and others No. 1 Tubb gauged 15 bbls. hourly flowing naturally for four hours on initial test. Total depth is 4,430 feet.

Magnolia Petroleum Co. has staked a 1½-mile outpost near the north end of the Kermit area of Winkler County. It will be known as No. 153 Walton, section 16, Block 77, P.S.L. Survey, and is for the further exploration of the extensive Walton ranch, much of which is still undrilled.

The third producer in the new Crockett pool in Crockett County was completed last week, the Choate and Hogan No. 1-J University, pumping 30 bbls. in 24 hours after acidizing. Location is 1½ miles south of present production, and offers an important extension to the producing area. As a fourth producer in the same area, about three-fourths of a mile southeast of the discovery, Black and Eubank No. 1 University bailed and pumped 25 bbls. daily after plugging back from 1,475 to 1,420 feet. Humble Pipe Line Co. is to lay a small line from their Yates field station to take this newly developed production.

Ordovician Prospect

The long expected topping of the Ellenburger limestone (Lower Ordovician) was finally reported in Magnolia and Tex-Mex No. 1-A McKee, deep exploratory hole in the Imperial area of northern Pecos County. The Ellenburger was topped at 6,102 feet, or 3,717 feet below sea level, and drilling to 6,136 feet in hard lime yielded no showings of oil or gas. Operators plan to make drill stem test of the section, however. The Simpson, or Middle Ordovician, was topped considerably higher here than in the prolific Ordovician field on Waddell lands in Crane County, about 12 miles north, but its base was encountered considerably lower.

Panhandle Field

Fifteen wells were completed in the Panhandle field last week and of this number 12 were oil wells and three gas wells. The total oil potential of the new producers amounted to 4,375 bbls., and the new gas flow was 212,705,000 feet. New locations in the field last week numbered six, a drop of three from the previous week. Hutchinson County received four of these while Carson and Gray counties received one each.

WEST CENTRAL TEXAS

Haskell County remained the center of attention for the West Central Texas district the past week in the four-county search for the deeper, Canyon series, lime production. Highlights included coring of saturation in the second producer for the new Haskell Pardue area, indication of prospects for a new pool in the southeastern corner of the county, spread of both the Avoca pool in Jones and the Ivy pool in Shackelford counties. A northeastern Callahan County wildcat showed oil and prepared to set pipe for a test of the Ellenburger lime.

Coring of Adams Branch lime 18 feet higher structurally in the second well for the Pardue area apparently assured a broad spread for the pool opened by Forest Development Corp. and J. W. McMillen 5 miles northeast of Stamford. Forest No. 2 Pardue logged lime top at 2,794 feet, took 1 foot of saturation at 2,806-07 feet and set pipe. In M. Collum Survey No. 4, it is 1,740 feet north of the discovery well which remains in an incomplete stage awaiting outcome of the second test.

Eight miles to the east, Fain-McGaha Oil Corp. and P. S. Kendrick No. 1 T. G. Hendrick, in Indianola Railway Survey No. 104, picked up a showing of free oil and gas in a stray sand below the Adams Branch and was attempting to shut off upper water behind 6-inch casing to test for commercial production. The pure sand was tentatively called the Cross Cut, middle Canyon. The crude is light green in color with a gravity of 41 degrees A.P.I. Besides the owners, a play was taken in the block by the contractors, Green & Owens of Abilene, Mid-States of Tulsa, Petroleum Producers of Wichita Falls and Humble.

Water showed for the first time on both the east and west sides of the Avoca pool, but only in small amount. The Jones area was given a quarter-mile west spread when Humble No. 2 Spencer, section 195, B.B.B.&C. Survey, flowed 482 bbls. in 14 hours, 32 per cent water; and a northeast advance when Fain-McGaha No. 2 Swedish Church, section 190, B.B.B.&C. Survey, flowed 516 bbls. in 12 hours, 14 per cent water, both from the Palo Pinto lime. Iron Mountain Oil Co. No. 2 D. A. Ivey, quarter mile north extension to the Shackelford deep lime, was attempting a squeeze job to shut off water, showing 16 per cent on a flow of 790 bbls. in 18½ hours from a total depth of 3,227 feet.

Possibility of a new Ordovician pool for Callahan County loomed when Wittmer Oil & Gas Properties, Inc., of Pittsburg No. 1 R. D. Williams and others, in T.E.&L. Survey 2269, topped Ellenburger lime at 4,077 feet to find a showing of free oil and shut down to await a new string of 7-inch casing. It is about 2 miles northeast of Putnam.

WEST CENTRAL TEXAS COMPLETIONS

Jones County

Thomas D. Humphrey No. 18-A Dorsey Estate, 151 bbls. of oil per day from 2,201-19 feet, total depth, deepened well.

Humble Oil & Refining Co. No. 2 R. B. Spencer & Co., 842 bbls. in 14 hours, 32 per cent water, after 1,000 gallons of acid at 3,277-91 feet, total depth.

Joe A. Worsham No. 1-A J. H. Commons, abandoned at 3,396 feet, total depth.

Fain-McGaha and Sinclair Prairie No. 2 Swedish Church, 516 bbls. in 12 hours, 14 per cent water, after 2,000 gallons of acid at 3,263-73 feet, total depth.

Danciger Oil & Refineries No. 2 Fain-McGaha fee, 323 bbls. in 24 hours, 6 per cent water, after 30-quart shot at 1,933-48 feet, total depth.

Humble Oil & Refining Co. No. 1 I. M. Irwin, 92 bbls. of oil and 25 bbls. of water in 24 hours from 2,550-53 feet, plugged back from 2,568 feet, total depth.

Shackelford County

Iron Mountain Oil Co. No. 2 D. A. Ivy, 790 bbls. in 18½ hours, 19 per cent water, from 3,213-27 feet, total depth, after 2,000-gallon acid treatment.

T. K. Simmons No. 16 B. C. Harvey, 55 bbls. of oil per day after 20-quart shot from 1,628-40 feet, plugged back from 1,711 feet, total depth.

F. H. Brock No. 1 R. E. Burns, abandoned dry at 702 feet, total depth.

Taylor County

Wichita Production Co. No. 1 J. H. Parramore, abandoned dry at 2,035 feet, total depth.

Throckmorton County

Dave Whitby No. 1 H. C. Welch, 5 bbls. of oil per day from 329-56 feet, total depth.

Callahan County

Hughes Petroleum Co. No. 1 Andrew Johnson, abandoned dry at 4,336 feet, total depth.

PANHANDLE COMPLETIONS

(24-hour gauges)

Carson County

Danciger Oil & Gas Co. No. 5 Block, 3,015-3,101 feet, 363 bbls.

Gray County

B. & D. Petroleum Corp. No. 1 Johnson, abandoned location. King Oil Co. No. 11 Volmert, temporarily abandoned location. Gulf Oil Corp. No. 6 Catlin B, 3,122-32 feet, 242 bbls. Hagy, Harrington & Marsh No. 1 Mongole, 2,507-2,645 feet, 14,964,000 feet of gas. Stanolind Oil & Gas No. 5 Hood, 2,984-3,111 feet, 509 bbls.

Hutchinson County

Alma Oil Co. No. 3 Whittenburg, 2,810-2,918 feet, 365 bbls. J. E. Crosbie, Inc., No. 28 Pitts, 2,814-2,915 feet, 618 bbls. Hobbs & Allen No. 1 Herring, 2,761-2,880 feet, 8,241,000 feet of gas. Holmes & Holmes No. 5 Lyall, 2,685-2,731 feet, 396 bbls. Humble Oil

(Continued on Page 108)

Central West

By STAFF CORRESPONDENT

Four Western Kentucky Wells Producing from McClosky Pay

OWENSBORO, Ky., May 23.—The Birk City, or Birk Dome, pool in eastern Henderson County, recently opened by the Hoosier Drilling Co. and others on the C. T. Blackwell lease, now has four wells producing oil, although three of them can not yet be called completions.

The Hoosier Drilling Co.'s discovery well, No. 1 Blackwell, started at 1,200 bbls. a day from McClosky pay in the Ste. Genevieve limestone (lower Mississippian), the pay having been topped at 1,872 feet and penetrated only 2 feet.

The Carter Oil Co. No. 1 O. L. Boswell, a direct offset, but which, owning to the irregular shape of the leases thereabouts, lies northwest of the discovery well, flowed 264 bbls. in 16 hours from the McClosky pay, at a total depth of 1,882 feet. In the last six hours the well averaged 21 bbls. an hour, or at the rate of 504 bbls. per day. W. E. Hupp and others No. 1 Julia Gateswood, also a direct offset, but southwest of the discovery well, got top of the McClosky at 1,882 feet, and at a total depth of 1,914 feet the well was given a 750-gallon acid treatment and pumped 200 bbls. in 12 hours.

Two thousand feet northeast of the discovery well, Snowden & McSweeney and the Cumberland Petroleum Co. No. 1 T. C. Jones (or Francis Dempwolf) topped the McClosky at 1,863 feet and swabbed 208 bbls. in eight hours with the bottom of the pay at 1,873 feet, but not altogether penetrated.

The Aetna Refining Co. of Louisville, Ky., was early on the scene of the discovery with a 4,500-bbl. barge on the Green River, a navigable tributary of the Ohio River, to take the oil from the Hoosier Drilling Co.'s well, and is the only purchaser in the field at this time.

No new work was started in the past week in the Birk City district but the Hoosier Drilling Co. with two new operations started the previous week; Thompson Drilling Co. No. 1 Mrs. Beulah Gilmore; Kentucky Natural Gas Co. No. 1 Otis Haynes; J. C. Ellis No. 1 K. A. Jones; Kentucky Natural Gas Co. No. 1 McHatton and Clark & Snyder and others No. 1 Tom Pork were reported last week. With four wells of assured production the others named will soon be added to the completed list.

In the Niagara district, Henderson County, Kentucky Natural Gas Co. No. 1 Major Heirs was abandoned at 860 feet. It had 48,000 feet of gas at 644 feet and a hole full of water at 860 feet. Mecca Oil Co. completed a 25-bbl. well in Niagara sand in No. 2 J. W. Wilson and was moving in to start No. 3. Jay Petroleum Co. was drilling below 100 feet in No. 2 R. C. Duncan.

Outside Operations

The week's record of completions in Western Kentucky, outside of the Birk City district was five oil wells, one gas well and five dry holes, a total of 11. The completions and new work started follow:

Breckinridge County, Falls of Rough district: A. V. Smith and others No. 10 Greene Bros., moving in.

Butler County, Rochester district: J. C. Ellis and others No. 1 J. F. Hayes, dry hole at 1,417 feet; W. E. Hupp and others No. 1 Estill Peay, dry hole, total depth not available; Easton & Evans No. 1 R. E. Cornell, drilling at 200 feet; A. C. Cornell No. 1 W. A. Tanner, drilling at 210 feet.

Daviess County, Utica district: Daugherty & Ellis No. 3 Clarence Leet, drilling at 400 feet; Amos Schaeffer and others No. 3 Boyd Bristow, total depth 1,627 feet, sandy lime at 1,624-27 feet, plugging back to 1,120 feet to shoot Jett sand. Pleasant Ridge district: General Drilling Co. No. 3 Dode Taylor, drilling at 250 feet. Cane Run School district: J. C. Ellis & Ashby No. 8 Noel Rhoades, 25 bbls. from Jett and Stray sands.

Grayson County, Falls of Rough district: A. V. Smith and others No. 1 Crit Porter, estimated 1,000,000 feet of gas per day from Bethel sand at 360-62 feet.

Hancock County, Easton district: J. C. Ellis No. 18 R. A. Richards, a 50-bbl. well in Jett sand at 395-432 feet, total depth 435 feet, shot with 120 quarts. Cabot district: Kentucky Natural Gas Co. No. 1 W. F. Anderson, drilling at 150 feet.

McLean County, North Livermore district: Kentucky Natural Gas Co. No. 3 W. A. Stevens, drilling at 500 feet. J. C. Miller, trustee, No. 11 Mrs. Fannie Foley, show of oil in Jett sand, plugged and abandoned. Island district: South Penn Oil Co. No. 2 Robert Nail, 5-bbl. well in Jett sand at 1,458-80 feet, total depth 1,483 feet; South Penn Oil Co. No. 5 H. K. and John Kirtley, spudding in. Buel district: J. C. Ellis No. 1 G. H. Tucker, drilling at 75 feet.

Muhlenberg County, Bremen district: Peerless Oil Co. No. 1 C. C. Gossett, shut down at 2,495 feet. Paradise district: South Penn Oil Co. No. 3 Rogers Crescent Coal Co., drilling at 1,304 feet. Rochester district: Porter Evans and others No. 1 V. R. Hammers, small show of oil at 915 feet, may drill deeper.

Ohio County, Sunnydale district: Kentucky Natural Gas Co. and others No. 1 E. Farmer, 30,000 feet of gas from Jackson sand at 866 feet, abandoned. Taffy district: Rex Pyramid Oil Co. No. 15 Scott Ambrose, 5 bbls. from Jett sand at 601-13 feet, total depth 640 feet, to be a key well. Adaburg district: Nollem Oil & Gas Co. No. 7 Vincent Crowe, rigging up. Friendship Church district: Cane Run Petroleum Co. No. 20 C. J. Rhoades, drilling at 150 feet. Buford district: Gregory & Evans No. 1 Lewis Trogdon, moving in.

Todd County, Fairview district: I. A. Polhamus and others No. 1 J. W. Hall, after being shut down at 800 feet is drilling deeper.

ILLINOIS

MATTOON, Ill., May 23.—Twenty-four wells were completed in Illinois fields in the past week, but the new operations numbered 48, or twice as many as the completed wells. Most of the first reports of new operations were from the Marion County, or eastern side of the Centralia townsite field. This pool is being drilled up rapidly and when the hectic campaign in the city and on its edges is through a great decline will be noted in drilling operations in the basin unless, meanwhile, the wildcats now drilling uncover a number of paying pools.

The Carter Oil Co. is drilling the deepest hole among the current wildcat operations. It is given as below 4,036 feet, and drilling, in this report, with a small oil showing at 3,978-4,000 feet. A test in White County is below 3,000 feet; one in Edwards County is below 3,220 feet and one in Effingham County was drilling at 3,852 feet.

The Week's Completions

Completed wells, with their sand records and initial 24-hour production, were as follows:

In the Centralia pool, Clinton County: Shell Petroleum Corp. No. 5 Buehler, NW SE SW section 1-1n-1w, top of Benoist sand 1,303 feet, total depth 1,345 feet, shot with 21 quarts, pumped 138 bbls. Adams Oil & Gas Co. No. 1 Keister A, SE SE SE section 2-1n-1w, sand 1,355 feet, total depth 1,376 feet, shot with 5 quarts, pumped 54 bbls. of oil and 3 bbls. of water; Shell Petroleum Corp. No. 2 G. E. Ellison, SW NW SE section 12-1n-1w, sand 1,365-84 feet, shot with 21 quarts, pumped 71 bbls.; Earl Thompson and others No. 1 Chamber of Commerce, sand 1,372-93 feet, shot with 30 quarts, pumped 90 bbls.; Thompson & Self No. 2 Emma Hanseman, NW cor. NE NW NE section 12-1n-1w, sand at 1,358-87 feet, shot with 20 quarts, pumped 250 bbls., (revised report); T. T. Eason & Co. No. 2 Saylor, NE cor. NW SE NE section 13-1n-1w, sand at 1,351-62 feet, pumped 150 bbls.; Huff, Stauffer & Boughton No. 1 Besant, SE NE NE SE section 13-1n-1w, sand 1,346-75 feet, pumped 175 bbls.; Rourke & Moore No. 1 Home B. and L., NE cor. SE NE section 13-1n-1w, sand 1,365-81 feet, shot with 35 quarts, pumped 140 bbls. In the Bartelso field, Clinton County, Bartelso Oil Co. No. 5 Schlorman, NE cor. SE SE section 5-1n-3w, sand at 969-98 feet, shot with 40 quarts, pumped 50 bbls.

In Wayne County, Texas Co. No. 1 Silverman, C E half SW NW section 16-3s-7e, completed in January, but shut in for lack of pipe line, was opened on May 9 and flowed 215 bbls. in 24 hours through 2-inch tubing and 5/64-inch choke. Later it flowed 178 bbls. in 24 hours through 7/64-inch choke.

In Jefferson County, Carter Oil Co. No. 1 Ray Free, C E half SE SW section 3-1s-2e, sand at 1,970-86 feet, flowed 219 bbls. of oil and 7 bbls. of water.

In the Centralia field in Marion County, Miller and others No. 1 Gregory, E half SW SW SW section 7-1n-1e, sand at 1,370-91 feet, shot with 10 quarts, pumped 125 bbls. of oil. J. Q. Gill and others No. 1 Illinois-Iowa Power Co., E half SW NW SW section 18-1n-1e, sand at 1,350-74 feet, pumped 480 bbls.; D. D. Huddleston No. 1 McKee, W half NE SW NW section 18-1n-1e, sand at 1,362-78 feet, shot with 60 quarts, swabbed 150 bbls.; John Pugh Drilling Co. No. 1 Haley Infirmary, E half NW SW NW section 18-1n-1e, sand at 1,351-75 feet, shot with 20 quarts, pumped 190 bbls. of oil; Bassinger & Lewis No. 1 Koelling, SE cor. SW NW SE section 19-1n-1e, Benoist sand at 1,461-74 feet, filling the hole with water, abandoned.

In Clay County, Pure Oil Co. No. 1 Gibson, C E half NW NW section 27-1n-7e, had Ste. Genevieve lime top at 3,095 feet, pay at 3,140-46 feet, and flowed 418 bbls. of oil through 2½-inch tubing; Pure No. 1 Bunn Consolidated, C E half NW NW section 16-2n-8e, Ste. Genevieve lime at 2,963 feet, pay at 3,002-20 feet, saturated dolomite at 3,029-35 feet, flowed 983 bbls. the first day, 1,124 bbls. the second and 990 bbls. the third, through tubing.

In Marion County, Patoka Oil & Gas Syndicate, Limited, No. 1 Thallman Estate, had Benoist sand at 1,746-59 feet, but showed only water. It was temporarily abandoned.

In Richland County, Pure Oil Co. No. 15 J. D. Coen, C E half NW SW section 4-3n-9e, had pay at intervals from 2,925 to 2,967 feet. It flowed 37 bbls. in 10 hours, but following a 5,000-gallon acid treatment flowed 213 bbls. in 24 hours. Pure No. 1 J. L. Fleming B, C E half SE SW section 5-3n-9e, pay at intervals 2,945-80 feet, acidized with 5,000 gallons, flowed 272 bbls. of oil the first 24 hours, increasing to 404 bbls. the fourth day. M. A. B. Oil Co. No. 1 Fred Allison, NE NE NE section 29-3n-9e, pay 3,008-11 feet, acidized with 5,000 and then 3,000 gallons, pumped 310 bbls. in 24 hours. Ohio Oil Co. No. 2 Schilling, C N half SE SE section 22-4n-9e, pay at 2,950-65 feet, flowed 564 bbls. naturally, but flowed 940 bbls. in 24 hours after a 5,000-gallon acid treatment. Pure No. 3 Ida Colburn, C S half NW SW section 33-4n-9e, pay at 2,971-85 feet, acidized with 5,000 gallons, flowed 270 bbls. in 24 hours.

In Fayette County, Carter Oil Co. No. 1 Larimore, SE NE NE section 11-8n-3e, had Benoist sand at 1,567-84 feet. It was shot with 20 quarts and pumped 90 bbls.; Carter Oil Co. No. 1 Main, C W half NE SE section 15-8n-3e, Benoist sand at 1,548-58 feet, flowed 480 bbls. per day through 2-inch tubing.

New Operations

Parshall & Graham No. 1 Harmon, SE SW SW section 22-1s-1w, Jefferson County, moving in rotary tools; W. C. McBride, Inc., SW cor. SE SE section 12-1n-1w, Clinton County, location; Shell Petroleum Corp. No. 6

Buehler, NW NW NW section 12-1n-1w, drilling at 866 feet; Adams Oil & Gas Co. No. 1 Coe, SW cor. SE SE section 13-1n-1w, moving in rotary; Adams Oil & Gas Co. No. 1 Stead, 1,530 feet from E and 1,600 from S lines of section 13-1n-1w, rigging up rotary; Jim Bond No. 1 Struchmyer, near C SW NE SE section 13-1n-1w, rigging up rotary; Dixie Oil Co. No. 1 Gutzler, NE SE SE section 13-1n-1w, drilling at 150 feet; John Pugh Drilling Co. No. 1 Allen, NE cor. SW SE section 13-1n-1w, Benoist sand at 1,355-70 feet and being cleaning out; Bell Oil Co. No. 3 Maddox, 1,100 feet from S and 200 feet from W lines SW quarter section 4-1n-3w, spudded; Newton & Ward No. 3 Gross, SE cor. SW section 5-1n-3w, rigging up standard tools.

In Crawford County, Ohio Oil Co. made location for No. 12 Bond, SE cor. NE NE NE section 36-6n-12w; Salvage Oil & Gas Co. No. 6 McGrillis, NE cor. NW NW SW section 25-8n-13w, deepening from 2,511 feet, shut down at 2,613 feet, top of Mississippi lime at 2,510 feet.

In Jefferson County, Carter Oil Co. No. 1 Stover, SE SE NE section 9-1s-2e, derrick; Carter No. 2 Dobbs, SW NE NW section 10-1s-2e, derrick; Carter No. 1 Moore, NW NW NW section 15-1s-2e, location.

In Wayne County, J. F. Hanke and others No. 1 Collins Heirs, NE NE SE section 24-1s-9e, location.

In Marion County, Centralia townsite, Cypress Oil & Gas Co. No. 1 Mrs. Prill, N half NE SW NW section 18-1n-1e, spudded; Gill and others No. 1 Laughlunn, NW SW SW section 18-1n-1e, drilling at 920 feet; Hawley Oil Co. No. 1 Reading, NW cor. SW SW SW section 18-1n-1e, rigging up machine; W. R. Hayes No. 1 Storer, SE NE SW section 18-1n-1e, drilling at 1,350 feet; Koenig & Son No. 1 Freant Estate, NE NW SW section 18-1n-1e, rigging up rotary; W. F. Lacey No. 1 Centralia Investment Co., SE SW SW section 18-1n-1e, rigging up rotary; Lane & Edwards No. 1 Sinclair Refining Co., NE SW SW section 18-1n-1e, set 8-inch casing at 800 feet; Joe Murphy No. 1 fee, SW SE NW section 18-1n-1e, building derrick; Joe Murphy No. 1 Lane, NE SW SW section 18-1n-1e, drilling at 600 feet; John Pugh Drilling Co. No. 1 Cairns, SW NE SW section 18-1n-1e, rigging up rotary; same company No. 1 Geary, NE NW SW section 18-1n-1e, Benoist sand top at 1,355 feet, total depth 1,370 feet, set 5½-inch casing at 1,355 feet; same company No. 1 Stover Estate, SW SW NW section 18-1n-1e, location; Dixie Oil Co. No. 1 Gutzler, NW NW NW section 19-1n-1e, shut down at 75 feet; Rockwood and others No. 1 Home B. and L., NE NW NW section 19-1n-1e, rigging up rotary; Shirley & Shepherd No. 1 Correll, SE SW NW section 19-1n-1e, shut down at 100 feet; W. C. Pollock No. 1 Kalberkamp, SE SW NW section 19-1n-1e, drilling at 75 feet; Stanley and others No. 1 Spataberts, SW SE NW section 19-1n-1e, spudded and shut down; Kalin, Hite and others No. 1 Draege, NW NW NW section 30-1n-1e, building derrick.

In Clay County, Pure Oil Co. No. 1 C. R. Bunn A, C W half NE NW section 16-2n-8e, moving in rotary; Pure No. 1 Daisy Bunn A, C W half SW NW section 16-2n-8e, moving in rotary; Eureka Oil Co. No. 1 Sieben, NW SW NE section 4-3n-8e, a wildcat, moving in rotary.

In Richland County, J. V. Wicklund was drilling at 1,925 feet in No. 1 McCauley B, NE SW NW section 7-2n-9e; Pure Oil Co. No. 7 Montgomery B, C W half SE NW section 4-3n-9e, derrick; Pure No. 5 Montgomery A, C W half SW SE section 8-3n-9e, location; Mammoth Producing & Refining Co. No. 3 Glenn Stewart, SE NW NW section 28-3n-9e, cellar and pits; Pure No. 4 Correll, C N half SW SE section 33-4n-9e, derrick; Pyramid Oil Co. No. 1 Winter, SE SE SE section 22-4n-10e, moving in rotary; Texas Co. No. 2 Zirkle, near C SE SW SW section 23-4n-10e, building derrick; Texas Co. No. 3-A Zirkle, SW cor. section 23-4n-10e, cellar and pits.

In Fayette County, Carter Oil Co. was drilling at 675 feet in No. 1 Mary Cummings, 316 feet from N and W lines of NE NE section 21-8n-3e, and made a location for No. 1 Wright, NE NW NE section 21-8n-3e, and moving in tools for No. 1 Logue, SW NW SW section 22-8n-3e. Steinmish and others were drilling at 600 feet in No. 1 Lisk, NW NW SE section 33-8n-3e.

Among the Wildcats

Pope County: C. C. Whitlock No. 1 Anthis, SE cor. NE NW NE section 12-11s-5e, was shut down at 1,745 feet.

Saline County: C. F. Bolton and others No. 1 Beagle, NW cor. NE section 13-9s-7e, Fredonia topped at 2,461 feet, total depth 2,601 feet. Will plug back and test showing at 440-45 feet.

White County: Mazda Oil Corp. No. 1 Meade, NE NE NE section 26-5s-9e, total depth 3,203 feet, set casing at 3,155 feet and rigging up standard tools.

Jefferson County: Nollem & Benoist No. 1 Kelly, NE NW NE section 25-4s-2e, shut down to make repairs, total depth 2,834 feet.

Edwards County: Leath Bros. No. 1 Lee, SW NE SE section 11-1s-10e, total depth 3,220 feet. Lost underreamer and drilling on iron with hole two thirds full of water.

Clay County: Kingwood Oil Co. No. 1 Graham, C S half SW NE section 13-3n-6e, drilling at 2,400 feet;

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Michigan Field Report

By
O. C. PRESSPRICH

Six New Producing Wells in Five Fields; Seven Failures

SAGINAW, Mich., May 23.—Production developments in practically all Michigan oil fields hit a lull last week after a month of steady progress. In five scattered Michigan fields only six new oil wells were recorded along with seven dry holes.

Prolific Buckeye in Gladwin County and questionable Edenville in Midland County failed to produce any favorable results. Allegan County, which for the past month has led all fields in production, hit a slump and chalked up only one producer against five failures, but rated high in drilling permits, indicating development in the sector is by no means discouraged.

Fields which rated production this week included Allegan-Salem, Midland-Jasper, Gladwin-Hay and Isabella-Sherman with one each and Arenac-Adams with two.

Edenville's pool apparently had established a northeastern boundary marker on production at Fortney Oil Co. No. 1 Corning Estate, NW NW NE section 26-16n-1w, with the hole more than 210 feet in the Dundee, and no show of oil. Neither were there signs of water, which fact puzzled operators and geologists alike. Extension to the northeast from Chapman's discovery in section 27 appeared to be blocked by this test. Several other tests are drilling, but none is nearer than a week from the pay zone.

Buckeye also marked time with no producers although one well, F. O. Whitelow No. 1 Campbell, was scheduled to be brought into production this week. The Whitlow-Campbell well is the most westerly extension in the south (Oard) pool of Buckeye, and if favorable is looked upon to open up a large area.

Tuscola County's play, which caused a brisk flurry in the industry when the first producer in the Thumb district was recorded, marked time last week, with no new activity. The discovery well was flowing about 30 bbls. daily. It is Frank Norton and George Kramer No. 1 Sharp, NW NW NW section 30-14n-8e, North Akron Township. Production dropped by more than half the past week, due, operators believed, to the high paraffin content of the crude. No plans were announced for acid treatment or for deepening.

Arenac County—Adams Township

Undoubtedly the most significant event of the week was development of the first Dundee lime production in the Arenac-Adams area at Pure Oil Co. No. 1 Shearer, SE SE NE section 26-19n-3e, an area which has produced only from the Traverse formation. The test, drilled through to the Dundee, and acidized, was rated at 75 bbls. daily after acid, after a first-day run of 100 bbls. The Dundee test is expected to bring a boom in Dundee exploration in the region. Another test came into production in the Adams field, Drabold & Sherry No. 1 Milne, SW NW NE section 25-19n-3e, which rated 150 bbls. after acid in the Traverse formation. Completion of the test was delayed somewhat by a fishing job.

Allegan County—Salem Township

The only producer in the Allegan field last week was Muskegon Oil Corp. No. 1 Ostrander, NW NW SW section 22-4n-13w, a 175-bbl. producer after acid. It maintained an unbroken record of five weeks in the production column for the field.

Dorr Township

Regal Dutch Petroleum Corp. No. 1 Commons, SE SE SW section 32-4n-12w, struck a dry stratum and will be abandoned.

Monterey Township

Three of Allegan County's five dry holes for the week were in the Monterey field, looked to a few weeks ago as a highly favorable Traverse production area. They included Norton Stewart Petroleum Co. No. 1 Boehn, SE SE NW section 8-3n-13w, Sprenger Bros. No. 1 Buck, SW SW SE section 22, and Stewart Oil Co. No. 1 Watkins, NW NW NW section 15. Dry holes slated for abandonment spread fan-shape from proved areas of production in the field.

Hopkins Township

The only active drilling test in Hopkins Township proved dry last week. It was Adrian Stellard Trust No. 1 Schafer, SE NW NW section 29-3n-12w.

Midland County—Jasper Township

The obscure and undeveloped Jasper region rated the largest new well of the week in the absence of producers in proved fields. The test was Pure Oil Co. No. 7 Bond-Root, C N half SW NE section 3-13n-2w, which gauged more than 300 bbls. daily after acid. The well was recently deepened in the Traverse formation.

Gladwin County—Hay Township

Hay Township returned to the production column for the first time in several weeks when Petroleum Investors, Inc., No. 3 Knight, SW SW SW section 16-18n-1e, rated 70 bbls. daily after acid. The development is located to the east of the north (Wicklund) pool in section 12 of Buckeye Township, and adjoins it. Several small producers have been developed in the area.

Isabella County—Sherman Township

Pure Oil Co.'s extensive holdings in the Sherman area continued to produce, with the No. 7 Ryckman, NW SW NE section 33-15n-6w, rated a 250-bbl. daily producer after acid.

Ogemaw County—West Branch Township

Weber Oil Co. No. 1 Gallagher, SW SW SE section 26-22n-2e, was completed dry and will be abandoned.

Kansas Developments

By
DAL DALRYMPLE

Five Wildcats Find Oil Pay; Rice, Ellis Areas Extended

The past week was an era of discovery in Kansas, with five wildcats opening new pools and extensions to several older pools being recorded. Several new wildcats were started, although first reports of new work were fewer than usual, probably because many of the Kansas operators were attending the International Petroleum Exposition in Tulsa.

One of the new pools was in Stafford County, where Stanolind Oil & Gas Co. was completing No. 2 Siefkes, NE SE NE section 3-22-12w, north of Hudson. It had Arbuckle lime at 3,594 feet, set 6-inch casing at 3,595 feet, drilled the plug and flowed 19 bbls. of oil an hour for four hours. After treating with 3,000 gallons of acid, it pumped 84 bbls. of oil the first hour and 211 bbls. the next two hours. This new area tentatively was designated as the South Sittner pool, being about 1 mile south of the Sittner pool.

The discovery well drilled by C. L. Price at No. 1 Wondra, NW NW NE section 10-17-12w, near Odin in Barton County, made potential of 539 bbls. of oil daily from Arbuckle lime. It was bottomed at 3,343 feet and plugged back 1 foot. It probably will be known as the Odin pool.

The new Ellis County pool opener, Colonial Oil Co., Duwe & Farris No. 1 Hadley, SE NE SE section 12-11-18w, total depth 3,332 feet, pumped 213 bbls. of oil the first four hours, 211 bbls. the next four hours and made potential of 1,266 bbls. Gravity of the oil was 34.4 degrees. No water was showing. It is nearly 2 miles south of the Burnett pool.

Cardinal Oil Co. and others No. 1 Fischer, SW NW SW section 31-21-12w, another Stafford County pool opener, was listed as a completion. It is located near the middle of a triangle formed by the Sittner, Gates and Drach pools. It had Arbuckle lime at 3,641 feet, total depth 3,650 feet, pumped 175 bbls. of oil the first four hours, 130 bbls. of oil the next four hours and made potential of 783 bbls. Gravity of the oil was 38.2 degrees.

A discovery in Russell County was due for early completion. It was Parks and others No. 1 Gorham Estate, SW NW SE section 19-15-15w, in the southwestern part of the county. It swabbed 210 bbls. of oil in four and one-half hours after a head, from Arbuckle lime at 3,347-52 feet, total depth.

Extends Stumps Arbuckle

The Arbuckle lime-producing sector of the Stumps pool in northwestern Rice County was extended nearly 1 mile westward at Vickers Petroleum Co. No. 1 Roesler, NW NW SW section 5-18-10w. It found Arbuckle lime at 3,199-3,200 feet, total depth, and filled with 44-gravity oil in four hours. It was to be acidized and tested. It was structurally higher than the Arbuckle lime wells to the east. The Lansing-Kansas City lime sector of the Stumps pool is directly north of No. 1 Roesler.

The Bemis pool of northern Ellis County was due for an extension at Cities Service Oil Co. No. 10-C Hall, one-fourth mile southeast of production. Operators were preparing for potential test after topping Arbuckle lime at 3,543 feet and setting 7-inch casing.

The nearby Walters pool of Ellis County was extended one-half mile southward at Republic Natural Gas Co. No. 1 Joy, NW NE NW section 14-12-18w. It made potential of 936 bbls. of oil, producing from Arbuckle lime.

Prospective Cowley Discovery

Gerald M. Smith and others No. 1 Wilson, SE SW NW section 9-33-6, wildcat 3 miles west of Dexter in southern Cowley County, found Mississippi lime at 3,087 feet and had oil pay at 3,096-3,112 feet. Fluid rose 600 feet in the hole, mostly high-gravity oil. Operators were drilling ahead in quest of deeper pay formations. Nearest oil production is in the Turner pool, 3 miles northwest. The No. 1 Wilson is on a trend between the Burden area of Cowley County and the Burbank pool of Osage County, Okla.

Atlantic Refining Co. No. 1 Nunn, C SE NE section 27-21-34w, far western outpost in Finney County, was rigging up standard tools after setting 7-inch casing. It was bottomed at 4,664 feet in Mississippi lime, with oil saturation found in cores at 4,654-64 feet. It will open the farthest west pool in Kansas if completed as a producer.

Estimated Daily Production

Estimated daily production for Kansas for the week ending May 21, and for the preceding week was as follows:

	Barrels	
	May 21	May 14
Oxford City	1,225	1,250
Burrton	10,000	11,725
Ritz-Canton	5,025	9,550
Graber	2,625	1,775
Hollow-Nikkel	3,125	3,200
Lerado	1,000	950
Voshell	2,325	2,375
Wellington	1,975	2,650
Ellsworth County:		
Lorraine	1,375	3,375
Other pools	1,300	1,365
Rice-Barton counties:		
Bloomer	2,250	3,425
Chase	4,925	5,850
Geneseo	2,575	2,800
Raymond	750	975
Silica	13,150	14,450
Silica—South	1,825	3,075
Keesling	675	1,075
Wherry	4,275	4,700
Miscellaneous Rice	3,255	4,215
Miscellaneous Barton	6,000	6,165
Russell County:		
Fairport	2,040	1,670
Gorham	1,425	1,600
Russell	955	1,475
Sullivan	4,340	7,365
Trapp	6,530	10,730
Miscellaneous Russell	6,735	7,585
Sedgwick County:		
Valley Center	985	1,015
Miscellaneous	2,865	2,685
Ellis County:		
Bemis	6,425	7,200
Miscellaneous	3,330	3,810
Kingman County	595	490
Stafford County	3,365	3,090
Greenwood County	9,400	9,500
Butler County	14,500	15,250
Other fields	23,305	16,040
Total Kansas	155,450	174,450

Several New Outposts

Carl Hipple has started work at No. 1 Martindell, CSL N half SW section 18-23-3w, in the Harvey County sector of the Burrton field, but about 1 mile from production.

Tide Water Associated Oil Co. No. 1 Jarboe, C N half N half SE section 25-26-14w, wildcat 1½ miles northwest of the town of Iuka and northwest of the Iuka pool in Pratt County, had started work.

National Refining Co. started operations at No. 1 Trustee, SE SE NE section 8-27-2e, wildcat between the Eastborough and Greenwich pools in Sedgwick County.

Work was started at No. 1 Gfeller, NW NW section 6-12-5, wildcat about 4 miles west of Junction City in Geary County. A. M. Landon of Topeka, Arthur Brewer of Tulsa and Winfield and the Midland Oil Co. are the operators. Nearest oil production is in the Lost Springs pool of northeastern Marion County. This is the second recent wildcat to be started in that general sector of Kansas, location of a test east of Manhattan in Riley County having previously been announced.

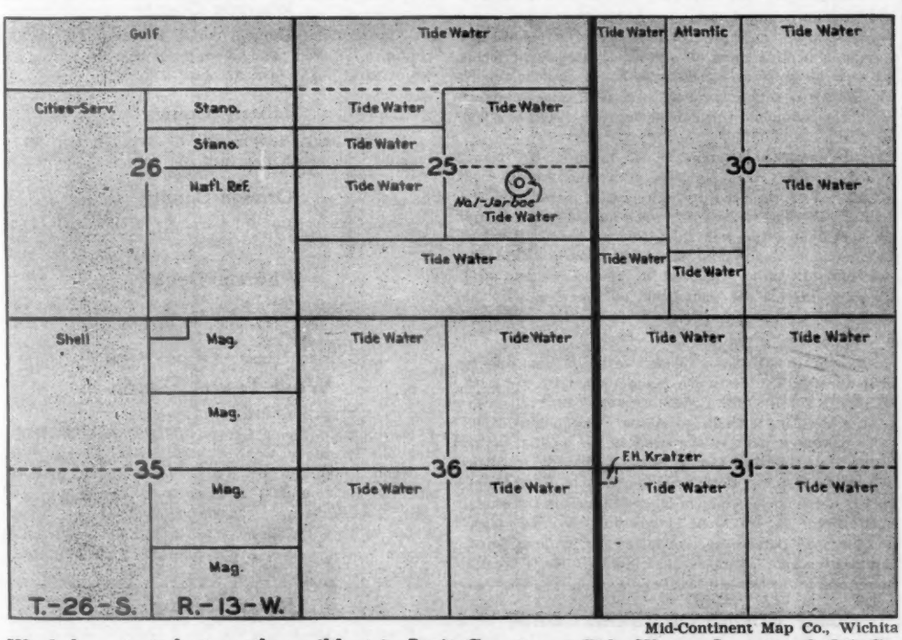
A new Russell County wildcat is that of El Dorado Refining Co. No. 1 Ruby, in section 1-15-13w. It is on a farmout from Ohio Oil Co.

Blakeslee, Seidhoff and others No. 1 Eckel, SE cor. section 17-27-7, Butler County wildcat, has rig erected. It is to be a Bartlesville sand test. It is 1½ miles northwest of the Keighley pool.

D. M. Crowe and associates staked location for No. 1 Murphy, SW SE section 34-29-1w, wildcat in southern Sedgwick County and 3 miles northwest of the Zyba pool of Sumner County.

New Pools Named

New areas recently opened by Kansas outposts have been classified by the Kansas steering committee of the



Mid-Continent Map Co., Wichita

Work has started at another wildcat in Pratt County, at Tide Water Associated Oil Co. No. 1 Jarboe, section 25-26-14w, northwest of the Iuka pool

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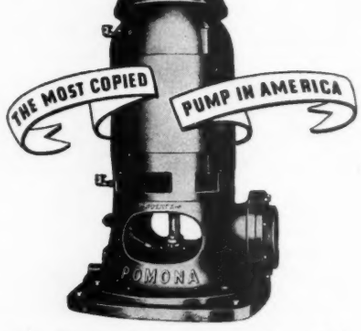

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Mid-Continent Oil and Gas Association Nomenclature Committee as follows:

Morel pool, Graham County, opened by Continental Oil Co. and others No. 1 Morel, CWL E half NE section 15-9-21w.

Greenvale pool, Russell County, discovered by Jones & Shelbourne at No. 1 Kuhnle, SE NW section 4-15-12w.

Ellinwood West pool, Barton County, opened by Crown Petroleum Co. No. 1 Schartz, SW SE NW section 7-20-11w.

Buhler pool, Reno County, opened by Amerada Petroleum Corp. and Westgate Greenland Oil Co. No. 1 Johns, SE cor. section 25-22-5w.

Bonham pool, Stafford County, discovered by National Refining Co. at No. 1 Bonham, SW SE section 28-25-12w.

Leesburgh pool, Stafford County, discovered by Continental Oil Co. at No. 1 Fair, CNL SW section 12-25-13w.

Areas recently opened by three other outposts were included in older pools, as follows:

Hayes & Sackrider No. 1 Windholz, NE cor. section 2-13-16w, Ellis County, included in the Fairport pool.

Torry & Feaster No. 1 Mueller, SE cor. section 29-21-12w, Stafford County, included in the Sittner pool.

Stanolind Oil & Gas Co. No. 1 Hahn, NE NW section 14-22-13w, Stafford County, included in the Drach pool.

Output Reduced

E. B. Shawver, Wichita operator, reduced production in the area affected by the recent 25-cent crude oil price cut announced by Kanotex Refining Co. last week by pinching in the flow of 58 wells he operates in Sumner and Cowley counties to 5 bbls. daily. Total reduction is approximately 1,500 bbls. daily. Mr. Shawver said the cost of developing his properties did not permit him to sell his oil at $1.05 a barrel, the price posted by Kanotex. He said the shut-in would continue indefinitely, or until the posted price for the area returns to normal. The reduction affects 50 wells in the Wellington pool, Sumner County, with a May allowable of 45,000 bbls., and eight wells in the Geuda Springs pool in Cowley County with a May allowable of about 5,000 bbls.

Gulf Coast Fields

(Continued from Page 93)

couraging showings from 8,663 to 9,011 feet. From 8,663-65 feet sandy shale showing oil was logged. Sand showing gas was cored at 8,668-69 feet and oil sand at 9,002-08 feet. This is the first well drilled since the discovery well which was completed at 8,144-8,204 feet.

Stanolind Oil & Gas Co. was pulling screen from No. 3-B Calcasieu National Bank, preparatory to reperforating higher after the well began to make salt water. The casing was perforated at 8,914-28 feet, and the well flowed a small amount of 45-gravity oil.

A shallower sand for the Timbalier Bay field, Lafourche Parish, was indicated by the core record of Gulf Oil Corp. No. 4 State. Sand showing oil was cored at 5,332-36 feet and on a drill stem test it made three stands of drilling mud, oil and sand. Additional coring showed oil sand at 5,336-43 feet, and on last report, the well was still in sand at 5,353 feet. The discovery well was completed through perforated casing at 6,955-59 feet.

Completion of Humble Oil & Refining Co. No. 1 Finch, South Crowley Prospect, Acadia Parish, continues to be retarded by salt water intrusion. The casing was reperforated last week at 7,311-13 feet, and for nine hours, the well flowed at the rate of 17 bbls. of pipe line oil per hour and then started making 50 per cent salt water. The well has been killed and after a squeeze-off job the casing will be reperforated. The well is located in section 22-10s-1e and is the third to be drilled on the prospect.

Two of the district's deepest wildcats continue to drill ahead. Both tests are being drilled by Fohs Oil Co., and No. 1 Buckley Bourg, section 77-19s-17e, southwest of the Lirette field, is drilling ahead below 12,606 feet, making it next to the deepest test in the world. No. 1 State, southeast of Lirette, is drilling in shale below 11,513 feet. Both tests, located in Terrebonne Parish, are reported to have logged favorable showings. Northeast of Lirette, Shell Petroleum Corp. made location for No. 1 Laterre, section 73-18s-18e, while at South Houma, the same company has spudded No. 1 Realty Operators in section 10-18s-16e.

COMPLETIONS ON TEXAS COAST

Following were the completed wells on the Texas Gulf Coast in the past week, with their initial production and sand records. All the wells produced through quarter-inch chokes unless otherwise noted.

Brazoria County

Hastings field: Jay Simmon No. 6 C. H. Alexander, 6,105 feet, perforated casing 6,080-95 feet, 645 bbls. Stanolind Oil & Gas Co. No. 18-A H. H. Ford, 6,138 feet, perforated casing 6,130-33 feet, abandoned; No. 14 G. Sneed, 6,080 feet, perforated casing 6,038-58 feet, 556 bbls.

Chambers County

Anahuac field: Humble Oil & Refining Co. No. 15 Broussard, sand 7,006-85 feet, 490 bbls. Cotton Lake field: Humble Oil & Refining Co. No. 1-B Lawrence, sand 6,512-15 feet, 124 bbls., one-eighth inch choke. Seabreeze field: Sun Oil Co. No. 1 R. J. Barrow, 8,555 feet, perforated casing 8,472-77 feet, 752 bbls. Turtle Bay field: Stanolind Oil & Gas Co. No. 6 Cooper Heirs, sand 6,613 feet, 430 bbls.; No. 7-A Silva, sand 6,611-22 feet, 489 bbls.

Fort Bend County

Thompson field: Humble Oil & Refining Co. No. 31-B-X Lockwood & Sharp, sand 3,430-3,500 feet, 89 bbls., one-eighth inch choke.

Galveston County

Dickinson field: Bennett Oil Corp. No. 1 Abbott, 8,109 feet, perforated casing 8,076-92 feet, 488 bbls.

Hardin County

Batson field: Texas Gulf Production Co. No. 2 Christian, 3,328 feet, plugged back 3,196 feet, 261 bbls.

Harris County

Clinton field: Stanolind Oil & Gas Co. No. 1 Velman Johnson, sand 3,826-31 feet, 462 bbls. Clear Lake field: West Production Co. No. 1-A Lee, 7,210 feet abandoned. Fairbanks field: Amerada Petroleum Corp.-Stanolind Oil & Gas Co. No. 1 J. P. Dawson, perforated casing 6,834-40 feet, 224 bbls., 7/64-inch choke; No. 1 R. Smith, perforated casing 6,837-47½ feet, 635 bbls.; No. 1 O. J. Post, perforated casing 6,838-51½ feet, 535 bbls. Mortex Oil Co. No. 1 H. E. Ley, perforated casing 6,838-40½ feet, 686 bbls. H. E. Williams No. 1-A Vaga, sand 6,815-35 feet, 528 bbls. Friendswood field: Humble Oil & Refining Co. No. 2 B. H. Goodwin, sand 5,945-6,044 feet, 629 bbls.; No. 1 Herman Hospital, sand 5,518-5,790 feet, 648 bbls. Tomball field: Humble Oil & Refining Co. No. 11-B Hope Quilton, perforated casing 5,550-60 feet, 264 bbls.

Jackson County

Cordelle field: Crown Central Petroleum Co. and others No. 2 Foust, perforated casing 2,681-86½ feet, dry gas well.

Jefferson County

Amelia field: Humble Oil & Refining Co. No. 13 Guinn, 6,798 feet, abandoned. Stanolind Oil & Gas Co. No. 8 Sargl, 5,885 feet, 97 bbls.

Liberty County

Hardin field: Humble Oil & Refining Co. No. 3 Chambers, sand 7,547-80 feet, 544 bbls.

Orange County

Orange field: Gulf Oil Corp. No. 1 O. Duhon, 7,604 feet, abandoned.

Wharton County

Withers field: Texas Co. No. 8-A A. C. Thompson, sand 5,545-51 feet, 340 bbls., 12/64-inch choke.

West Texas Fields

(Continued from Page 102)

& Refining Co. No. 1 Groves, 3,118-50 feet, 286 bbls. Magnolia Petroleum Co. No. 3 S.W.O.&D., 3,125-40 feet, 194 bbls. Bob Murphy No. 2 Whittenburg, 2,648-63 feet, 397 bbls. Stekoll & Dye No. 2 Carver-Whittenburg, 2,925-3,205 feet, 26,000,000 feet of gas. Tide Water No. 2 Umpires, 3,085-3,125 feet, 630 bbls. Robert Watchorn No. 2 Whittenburg, 2,668-2,715 feet, 345 bbls.

Moore County

Shamrock Oil & Gas Co. No. 1 Garland-McKee, gas pay 2,808-55 feet, oil pay 3,385-90 feet, 30 bbls. oil and 163,500,000 feet of gas.

North and East Texas

By MITCHELL TUCKER

Archer County's Deep Tests Commanding Major Interest

WICHITA FALLS, Tex., May 23.—Archer County held the center of attention in the North Texas area for another week as exploration for new deep Strawn sand pools continues. The possibility of a new oil pool in the eastern part of the county was still undetermined at the close of the week. Adams Oil & Gas Co. No. 1 T. Moer, section 21, Block 3, Clark & Plumb subdivision, showed promise of production two weeks ago when oil sand was encountered from 4,135-47 feet and from 4,152-65 feet, total depth. However water is threatening from the bottom 4 feet of the hole. Location is 1 mile east of Scotland in the eastern part of the county. Some observers estimate the well capable of 50 bbls. daily.

Blackwell Oil & Gas Co. and others No. 3 Wilson, deep discovery well in the Ellenburger limestone, Lower Ordovician, remained shut in with storage full after showing a production increase to 50 bbls. per hour on a three-hour test. The well is a southeast offset to the same operators' deep Strawn discovery well in the Panther pool.

Possibilities were seen last week for a second Ordovician field in Archer County. Humble Oil & Refining Co. and Fain-McGaha Oil Corp. No. 1 Fuller, Section 12, Block 1, H.&T.C. Survey, in the northeastern corner of the county and approximately 11 miles east and slightly north of the Panther pool, cored a saturated lime section believed to be Ellenburger from 5,019-5,115 feet. Operators were preparing to core ahead at the close of the week.

Two wildcat locations were made in northern Archer County. One and a quarter miles northeast of Sikes & Johnson No. 1 Walter, 3-mile northeast outpost to the Panther pool, Frank King staked No. 1 Anita Koenig, a 4,200-foot test in the F. Mosley Survey, Abstract 297. On the western side of the county, Gray & Thweatt staked No. 1 W. P. Ferguson, section 2, S.P. Survey, Abstracts 968 and 1148. This wildcat is 1½ miles northwest of Mankins and on the edge of the old Freeman-Hampton shallow pool.

K.M.A. Pool

New locations in the K.M.A. pool showed a considerable decline. Limited gathering lines and the recent policy of the Texas Pipe Line Co. to accept no more connections in the pool has brought about this situation. At a meeting of all operators in the K.M.A. pool and the new Panther pool in Archer County, plans were tentatively formulated whereby the two pools might be placed on a top allowable basis instead of a top per well allowable basis. This will be accomplished by the various pipe line companies nominating the amount of oil they will handle during 30-day periods, and the allocation to individual wells will continue on the present basis of 50 per cent acreage and 50 per cent per well. The whole amount of nominations will be prorated throughout the pool with revisions each week to care for new wells completed.

Hopes for extending production on the far west side of the K.M.A. field received a major setback last week when Shell Petroleum Corp. and Phillips Petroleum Co. No. 1 H. Riley Estate, Floyd Jordan Survey, Abstract 167, drilled plug at 3,815 feet and the hole filled 3,000 feet with salt water. Operators are making an electrical survey of the hole to determine the source of the water. The test is about 1½ miles northeast of the Geier Brothers & Jackson No. 1 Ancell test which was abandoned several months ago after encountering salt water.

Wilbarger County

A new oil pool was given Wilbarger County when King Oil Co. and Phillips Petroleum Co. No. 1-W Well, section 63, Block 14, H.&T.C. Survey, was completed for 172 bbls. of oil per day. Production is from an 8-foot section of sand from 2,897-2,905 feet, a new producing horizon for the area. Nearest production is King Oil Co. No. 1 R. L. Castlebury, section 68, Block 14, H.&T.C. Survey, which is producing from the 2,250-foot level.

Cooke County

First deep oil pool for Cooke County was in prospect as a result of the showings in the Sinclair-Prairie Oil Co. No. 1 J. M. Best, Thomas Toby Survey, Abstract 1054. The wildcat is located in Delaware Bend and just east of the Red River. The test topped a rich oil sand at 4,887 feet and cored 10 feet to 4,897 feet, still in the saturated section. A drill-stem test is reported to have revealed several heads of live green oil. This wildcat is projected to 7,000 feet and was expected to test the Ellenburger of Lower Ordovician. It has been coring since 2,765 feet and drill-stem tests were made of three levels between this depth and 4,000 feet.

EASTERN TEXAS FIELDS

DALLAS, Tex., May 23.—Extension of the Flag Lake pool of northwestern Henderson County 1¾ miles southwest was in prospect last week following favorable showings in Texas Co. No. 1 Adamson (previously No. 1 Nolan) in the N. Parsons Survey, about 1½ miles southwest of the pool opener. On a minute and a half drill stem test from 4,043-45 feet, through one-quarter inch top and bottom chokes, the well showed 90 feet of oil and 30 feet of mud. Operators shut the well in and were preparing to run tubing for initial production tests. This test has checked considerably higher structurally than the wells in the pool proper so if it is completed for a producer, quite an extensive area will be thrown open for development.

Failure 4 miles north of the pool was reported when Tyler & Smith plugged and abandoned No. 1 Perry, A. L. Adams Survey, after coring into salt water at 3,205 feet.

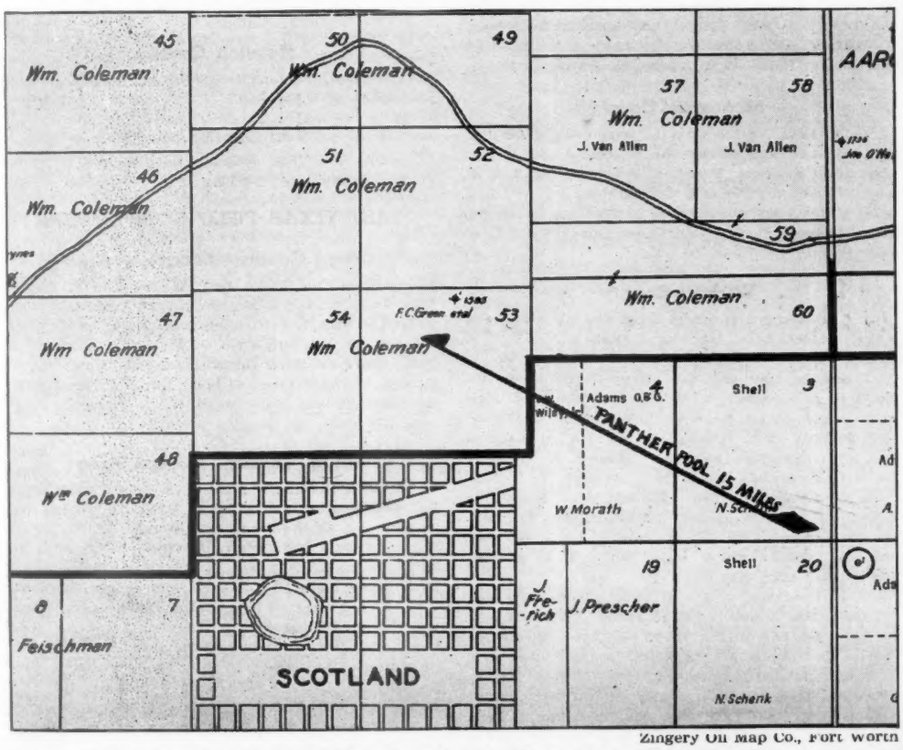
Houston County

Northwestern Houston County's Navarro Crossing field received its second producer and a location west extension last week when Humble Oil & Refining Co. No. 1 R. Smith (formerly Burns) flowed at the rate of 20 bbls. of oil per hour with 6 per cent basic sediment. Production was through one-quarter inch tubing choke from a 12-foot section of Woodbine sand at 5,877-89 feet. The low gas-oil ratio of 900 to 1 as compared with the 4,700 to 1 ratio of the discovery well was considered favorable by operators. With several locations already staked, this field is scheduled to receive a more extensive drilling campaign by both the Humble company and the Sun Oil Co., largest lease holders in the area.

Deep Tests

Drilling was halted in East Texas' deepest test, Humble Oil & Refining Co. and Gulf Oil Corp. No. 1 E. Robertson, M. Mann Survey, 2½ miles southeast of Longview in Gregg County, as operators made an electrical survey of the hole then prepared to run 9,300 feet of 5½-inch casing and test oil shows encountered in a section of hard sandy shale and lime above 10,275 feet, total depth.

On the Kelsey dome in Upshur County, Tom Hunter and American Liberty Oil Co. No. 1 J. P. Carter, J. H. Fields Survey, 1 mile north of Kelsey, was drilling ahead at the close of the week below 9,082 feet after recover-



Zingery Oil Map Co., Fort Worth

Adams Oil & Gas Co. No. 1 T. Moer, section 21, Clark & Plumb subdivision, 1 mile east of Scotland, prospective deep Strawn sand pool opener approximately 15 miles southeast of the Panther pool in Archer County

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ing only 4 feet of water sand in a core from 8,978 84½ feet earlier in the week.

In Smith County, 10 miles east of Tyler, H. L. Hunt No. 1 S. H. Bradly, T. P. Payne Survey, is shut down awaiting orders at a total depth of 7,528 feet after making an unsuccessful attempt to loosen pipe by running 4,400 feet of 2-inch tubing outside of the stuck drill pipe and circulating.

Talco Field

First actual wildcat test for the Talco pool of northwestern Titus and eastern Franklin counties in many months was reported last week when Gulf Oil Corp. planned to drill a deep test to the Paluxy sand. The test will be on the company's 175-acre Rutherford lease in the X. W. Lewis Survey, 1 mile southeast of Hagansport in Franklin County and on the northwestern edge of the pool.

NORTH TEXAS COMPLETIONS

Archer County

Blackwell Oil & Gas Co. No. 1 Wilson McCroty, 3,812-45 feet, 1,224 bbls. Ligon & Burns No. 2 A. P. Nichols, abandoned location. R. B. Magee No. 1 W. S. Scruggs A, 1,364 feet, dry. T. Minnich No. 3 Jennings, 1,760-65 feet, 15 bbls. H. Renfro, trustee, and others No. 1 J. T. Longley, 1,012 feet, dry. Shappell Oil Co. No. 1 G. Bell, 3,719 feet, dry. J. S. Smith No. 2 J. T. Longley B, 947-52 feet, 10 bbls. Thurmond & Lipscomb No. 1 L. F. Wilson, 3,944-3,963 feet, 896 bbls.

Baylor County

G. H. Jones and others No. 2 J. J. James, 600 feet, dry.

Clay County

Barnett Petroleum Co. No. 1 Ben Nutter, 4,087 feet, dry. Bridwell Oil Co. No. 14 T. C. Thornberry, 1,071-98 feet, 216 bbls.; No. 15 T. C. Thornberry, 1,077-1,112 feet, 312 bbls. Kimmell Lee and others No. 7 Mrs. Lou Firestone, 1,098-1,120 feet, 65 bbls. Metzner & Burns No. 5 L. Thornberry A, 1,095-1,103 feet, 50 bbls.

Cooke County

Trumter Oil Co. No. 1 A. Reiter, 1,597 feet, dry.

Jack County

Hanlon-Buchanan, Inc., No. 2 Mrs. E. W. Rankin, 3,304 feet, dry. Perrin & Gillespie No. 4 Clayton Bros., 3,040-3,137 feet, 280 bbls. C. B. Pruitt No. 1 M. Covington, 238-342 feet, 20 bbls.; No. 2 M. Covington, 310-326 feet, 15 bbls. Roy Rogers No. 2 J. H. Shown, 380 feet, dry. Rowan & Nichols No. 1 A. M. Bailey, 2,809-2,830 ft, 165 bbls. Texas Crusader Oil, Inc., No. 2 J. Matlock, 3,061-3,096 feet, 342 bbls. C. D. Thornton No. 6 F. C. Bloodworth, 220-348 feet, 2 bbls.

Montague County

O. V. Beck No. 22 Cora L. Davenport, 2,038 feet, dry. Donnell and others No. 1 Mrs. A. B. Hinton, abandoned location. Frank R. Robinson No. 1 S. F. Loy, 777 feet, dry. Seitz & Comegys No. 4 J. W. King, 1,744-55 feet, 298 bbls.; No. 5 J. W. King, 1,740-48½ feet, 360 bbls. Sinclair Prairie and others No. 2 D. T Holt B, 1,630-1,670 feet, 50 bbls.

Wichita County

J. C. Hawkins and others No. 2 Sue Mitchell, 3,874-3,923 feet, 992 bbls. Horwitz & Oldham No. 7 D. E. Hooks, 3,802-30 feet, 600 bbls. C. H. Lebbow No. 13 A. J. Schultz, 1,940 feet, dry. Magnolia Petroleum Co. No. 1 R. L. Kempner, 3,788-3,848 feet, 608 bbls. Magnolia Petroleum Co. No. 6 W. T. Waggoner A, 1,607-27 feet, 24 bbls. M.L. Drilling Co. No. 1 First National Co., 3,767-3,886 feet, 880 bbls. Mogren & Anderson No. 4 C. A Mertens, 932-47 feet, 194 bbls. C. E. Morrison No. 1 Foster & Allen, 1,164 feet, dry. Murchinson & Cranfill No. 3 Waggoner, 3,775-3,825 feet, 678 bbls. W. B. Omohundro No. 2 J. R. Pace B, 3,625-3,845 feet, 896 bbls. Omohundro & Staley No. 1 T. L. Burnett and others, 4,248 feet, dry.

W. H. Peckham No. 2 N. H. Martin, 3,761-3,853 feet, 584 bbls. Pois & Schulz No. 13 Foster J, 1,256-64 feet, 170 bbls.; No. 14 Foster J, 915-20 feet, 145 bbls. George Proctor and others No. 32 Foster A, 1,969 feet, dry. Ryan Consolidated Petroleum Co. No. 129 G. L. Nance, 3,808-3,953 feet, 160 bbls. Staley Oil Co. No. 2 First National Co., 3,840-3,988 feet, 360 bbls.; No. 5 First National Co., 3,780-3,899 feet, 240 bbls. Sunray Oil Co. No. 3 Mangold, 3,702-3,841 feet, 2,560 bbls. Sunray Oil Co. No. 4 Mangold, 3,722-3,765 feet, 600 bbls. Texas Co. No. 1 First National Co., Kemp, 3,638-3,850 feet, 536 bbls. W-E Production Co. No. 2 L. C. Denny, 3,780-3,890 feet, 720 bbls.; No. 1 W. W. Overbey, 3,8034,016 feet, 288 bbls.

C. J. Bohner No. 1-B First National Co., 3,613-3,855 feet, 1,120 bbls. L. T. Burns No. 23 Waggoner, 4,005 feet, dry. Chapman & McFarlin No. 5 W. P. Ferguson, 3,793-3,881 feet, 472 bbls.; No. 3 J. L. Waggoner A, 3,748-3,801 feet, 304 bbls. Continental Oil Co. No. 2-B Waggoner C, 3,762-3,812 feet, 560 bbls. Deep Oil Development Co. No. 2 J. R. Pace, 3,812-3,890 feet, 480 bbls. Haberle & Thornton No. 1 First National Co. A, 3,728-3,857 feet, 880 bbls. W. H. Hammon No. 2 Sue Mitchell B, 3,830-90 feet, 1,224 bbls. Hammon, Hanlon-Buchanan, Inc., and others No. 5 Fassett & Tuttle, 3,908-61 feet, 696 bbls.; No. 8 Fassett & Tuttle, 3,890-3,969 feet, 856 bbls.

Wilbarger County

Maxwell and others No. 1 Zipperle, abandoned location. Phillips Petroleum Co. No. 7 W. T. Waggoner, 2,555 ft, dry. Republic Natural Gas Co. No. 1 W. T. Waggoner, 2,473 feet, dry.

Young County

Duncan Holt & Marchman No. 27 Benson, 891,900 feet, 100 bbls.; No. 28 Benson, 886-903 feet, 100 bbls. J. Fuller No. 1 F. A. Morgan, 154 feet, dry. N. D. Goldsmith No. 5 J. R. Wilson, 1,001 feet, dry. Gorsuch Oil Co. No. 26 Mrs. O. W. Mathews, 705-27 feet, 10 bbls. Frank J. Lennon No. 1 G. Moore, 697 feet, dry. Ohio Fuel Oil Supply Co. No. 1 Mrs. E. Taylor, 3,908-3,999 feet, 840 bbls. D. L. Wolre No. 3 J. L. Castleman, 1,236 feet, dry.

EAST CENTRAL TEXAS COMPLETIONS

(24-hour gauges)

Anderson County

In the Long Lake field, Dietz & Reagan No. 2 M. L. Beiler, 5,353-64 feet, 100,000,000 feet of gas; F.H.E. Oil Co. No. 1 M. Sessions, 5,336-40 feet, 131 bbls.; Hunt Oil No. 1 E. Hutcherson, 5,268-5,304 feet, 104,000,000 feet of gas; Hunt Oil No. 1 Shaw & Cern, abandoned location.

Cherokee County

Wildcats: Bunn Drilling Co. No. 1 C. Bounds, 4,014-15½ feet, 48 bbls.; Comrade Oil Co. No. 1 J. M. King, dry and abandoned at 5,510 feet.

Henderson County

In the Cayuga field, F. M. Allison No. 5 Williams, 4,065-87 feet, 165 bbls. A wildcat, Tyler & Smith No. 1 Phoenix Realty Co., dry and abandoned at 3,212 feet.

Houston County

A wildcat, Peyton Bros. No. 1 Daniels, dry and abandoned at 6,042 feet.

Van Zandt County

In the Van field Overton Refining No. 7 G. W. Carter, 2,892-94 feet, 24 bbls.

EAST TEXAS FIELD COMPLETIONS

(24-hour gauges)

Gregg County—Longview Area

Arkansas Fuel Oil No. 10 T. Snoddy, 3,500-85 feet, 64 bbls. Deep Rock and Murphy No. 16 Pritchard, 3,506-37 feet, 80 bbls. L. S. Flannery No. 9 York, 3,554-81 feet, 125 bbls. B. F. Phillips No. 7 Callum, 3,534-49 feet, 45 bbls. Stanolind Oil & Gas Co. and Tide Water No. 16 H. Kee, 3,517-3,630 feet, 43 bbls.; No. 29 Persons, 3,483-3,546 feet, 50 bbls. Superior Oil No. 29 Ingram, 3,515-57 feet, 138 bbls.

Gregg County—Kilgore Area

All State Refining Co. No. 9 E. Muckleroy, 3,589-90 feet, 60 bbls. Gulf Oil Corp. No. 44 A. Spears, 3,533-58 feet, 50 bbls.; No. 48 A. Spears, 3,535-46 feet, 50 bbls. T. D. Humphreys No. 22 A. Spears, 3,543-69 feet, 50 bbls.; No. 23 A. Spears, 3,543-72 feet, 44 bbls. T. L. James No. 19 L. L. Lacey, 3,524-3,600 feet, 58 bbls. Roger Lacey No. 7 fee, 3,536-48 feet, 60 bbls. Potter Brothers No. 7 Barton Estate, 3,526-51 feet, 5 bbls. R. Lacey No. 8 D. Beall, 3,535-48 feet, 45 bbls. Producers Investment Co. No. 9 Butts, 3,540-80 feet, 50 bbls. Shell Petroleum Corp. No. 20 P. M. Bates, 3,542-3,635 feet, 60 bbls.; No. 17-A J. Douglas, 3,606-07 feet, 44 bbls.; No. 18-A J. Douglas, 3,591-94 feet, 17 bbls.; No. 33-A Laird-Crim, 3,602-11 feet, 52 bbls.

Rusk County—Kilgore Area

C. L. McMahon No. 7 D. Wills, 3,490-3.600 feet, 50

bbls. A. D. Roberts No 7 Brightwell, 3,641-44 feet, 120 bbls.

Rusk County—Joiner Area

W. B. Hamilton No. 20 Gambrell, 3,648-50 feet, 60 bbls. Humble Oil & Refining Co. No. 16 W. B. Kee, 3,742-44 feet, 70 bbls.; No. 12 J. Thompson, 3,649-52 feet, 78 bbls. Hunt Oil No. 6 Thompson, 3,708-30 feet, 60 bbls. C. H. Lyons No. 10 W. P. Moore, 3,545-99 feet, 20 bbls. McDonald No. 4 C. Hannah, 3,605-06 feet, 60 bbls. Ohio Oil Co. No. 45 S. H. Moore, 3,650-3,717 feet, 32 bbls.; No. 9 Warren Heirs, 3,595-3,653 feet, 34 bbls. Stanolind Oil & Gas Co. No. 34-A H. C. Maxwell, 3,745-3,806 feet, 47 bbls.; No. 38-A H. C. Maxwell, 3,740-92 feet, 59 bbls. Ward Oil No. 12 C. C. and J. E. Giles, 3,600-88 feet, 38 bbls.

Upshur County—Longview Area

Ellis Oil No. 15 C. J. Mackey, 3,672-74 feet, 25 bbls.; No. 4 A. D. Phillips, 3,703-06 feet, 18 bbls. Magnolia Petroleum Co. No. 14 Adkins, 3,689-96 feet, 80 bbls.

Smith County

W. B. Hamilton No. 18 L. A. Gambrell, 3,667-68 feet, 60 bbls. Weaver-Crim No. 11 B. and T. Stone, 3,740-48 feet, 48 bbls.

La.-Ark. Fields

(Continued from Page 96)

Its location south of the Buckner-Schuler trend, which has seen considerable Big lime development during the past several months, makes it an important test from the standpoint of possible extension of the lime play into Louisiana.

Arkansas Proration

Dissension was evident at the latest hearing of the Board of Conservation for the state of Arkansas in El Dorado last week. Following a drastic cut in the allowable production of the Schuler field in May, Lion Oil Refining Co., major operator in the field, stated the opinion that the 200-bbl. allowable in the Jones sand is too low by about 600 bbls. Although charges of arbitrary rulings on the part of the board were not made, that body's right to set allowables without conducting hearings for interested persons was challenged.

In view of the fact that all necessary data for consideration in the Schuler Jones sand regulation was not available at the hearing last Friday, the hearing on that horizon was postponed until May 28.

Testimony was received in regard to rulings for the Buckner, Miller County Rodessa and the Magnolia-Village, Columbia County, areas. The Buckner allowable was set at 800 bbls. per day, based half on acreage and half on bottom-hole pressure, with development on a 40-acre plan. The suggestions for rules in the Magnolia-Village area, consisting as yet of but one oil well, followed generally those for the Buckner field. Miller County Rodessa allowables were not changed, but indications were that it may be revised following the next bottom-hole pressure survey early in June.

The Buckner field gained a second good oil well in as many weeks, with completion of Standard Oil Co. of Louisiana No. 2 Crone. The well made an initial gauge of 86 bbls. per hour for three hours through open tubing, then averaged 8 bbls. per hour through one-eighth inch choke.

Village Test

East of the newly opened Magnolia field in Columbia County, Standard Oil Co. of Louisiana No. 1 Phillips, in the Village area this week made no new developments. Casing was not set, as originally planned, and the latest report was that the test was coring hard lime at 7,566 feet.

Southwest Texas Fields

(Continued from Page 100)

In the same county and in the J. Cisneros Survey 79, Sun Oil Co. No. 1 Young, cored sand with a slight odor of oil at 1,302-03 feet; sand with a good oil odor at 1,304-07 feet and sand showing oil at 1,307-13 feet. Oil sand was logged at 2,708-11 feet and shale at 2,711-15 feet. A 15-minute drill-stem test at 2,695-2,715 feet resulted in 10 feet of drilling mud and a slight blow of gas. It is coring below 2,716 feet.

The potentiality of Red Bank Oil Co. No. 1 H. H. Coffield, which has indicated a new Edwards lime pool for the Balcones fault line, remains in doubt. The well flowed 143 bbls. of fluid in nine hours through a 1-inch choke and went dead at 7 a.m. on May 17. Tubing is being pulled to install flow valves. At one time the well flowed from 20 to 30 bbls. of fluid per hour. The discouraging feature of the test is that the fluid content is 70 per cent oil and the balance is basic sediment which carries a strong taste of salt water. Production is from the Edwards lime section at 6,170-71 feet.

In Bastrop County, Humble Oil & Refining Co. No. 1 Heilsman is drilling in Del Rio lime at 6,487 feet. The top of the Buda lime is reported at 6,350 feet and a good showing of oil was reported logged at 6,364-68 feet. The hole is scheduled to be drilled to the Edwards lime, and if no saturation is found, the above showing will be tested. It is located in the J. Cunningham Survey.

Paul Teas No. 1 McKnight, Dimmitt County, which blew out last week at 2,451-56 feet, has been plugged back to 1,900 feet and the hole will be sidetracked preparatory to redrilling to the 2,400-foot section where it made an estimated 8,000,000 feet of gas while blowing wild.

COMPLETED WELLS

Completed wells in proven Southwest Texas fields with their total depth and initial 24-hour production of the producing wells were as follows:

Caldwell County

Branyon field: Lincoln Petroleum Co. No. 9-B Branyon, 2,360 feet, abandoned. Dale field: Marts & Beaver No. 1 Haynes, 2,265 feet, abandoned.

Duval County

Hoffman field: Cox & Hamon No. 28 Green, perforated casing 2,810-17 feet, 80 bbls., jetting.

Guadalupe County

Darst Creek field: United North & South Development Co. No. 11-A Dix, 2,496 feet, 132 bbls., pumping.

Nueces County

Agua Dulce field: Union Producing Co. No. 1 Chapman, 5,704 feet, abandoned. Flour Bluff field: Humble Oil & Refining Co. No. 13 Webb, 6,662 feet, 143 bbls., one-eighth-inch choke. Saxet field: Southern Minerals Corp. No. 10 Ocker, 4,870 feet, 61 bbls., jetting. South Clara Driscoll field: Navarro Oil Co. No. 1 House, 5,328 feet, 54 bbls., five-sixteenths-inch choke. Seaboard Oil Co. No. 3 Dugger, perforated casing 5,292-5,306 feet, 129 bbls., 11 hours. West Saxet field: Renwar Oil Co. No. 1 C. H. Harrington, 5,838 feet, abandoned.

Victoria-Calhoun Counties

Heyser field: Blanco-Buchanan No. 10 Dunwoody, perforated casing 5,562-70 feet, 42 bbls., three hours, three-sixteenths-inch choke. George Echols No. 12 W. H. Bennett, perforated casing 6,031-33 feet, 114 bbls., 7/64-inch choke. McFaddin field: Barnsdall Oil Co. No. 7 McFaddin, 4,402 feet, 114 bbls., 7/64-inch choke. Transwestern Oil Co. No. 5-E McFaddin, sand 4,390-4,409 feet.

Eastern Fields

(Continued from Page 88)

Locations Made for New Wells

The following locations have been announced: In Boone County, Pond Fork Oil & Gas Co. on its property in Washington district; Hope Natural Gas Co. No. 7811 on the J. W. Kessinger farm; Sherman district, Pure Oil Co. No. 289 Williams Coal Co. tract; Washington district, Hope Natural Gas Co. on the Julian Hill farm.

In Fayette County, Godfrey L. Cabot, Inc., No. 11 Kanawha Gauley Coal & Coke Co., in Falls district. In Gilmer County, the McCall Drilling Co. on the Lee Gainer and Lilly May Wigher farm. In Logan County, Boone County Coal Corp. No. 11-K on its property in Logan district. In Marshall County, A. G. Phillips on the H. M. Wellman farm in Cameron district.

In Pleasants County, W. F. Carmichael on the Earl Wells farm in Union district. In Ritchie County, J. W. Rowland on the Henry Bunner farm in Grant district. In Clay district, Dr. E. S. Woodyard, a second test on the W. H. and D. M. Bradford farm.

In Tyler County, L. G. Pigott a second test on the W. M. Ash farm in Centerville district. In Upshur County, Hope Natural Gas Co. No. 3 Haxen Phillips, in Banks district.

In Wetzel County, Hope Natural Gas Co. on the Estel Miller farm in Center district. In Proctor district, Hazlett Bros. and Conley on the A. Lane Mason farm and Manufacturers Light & Heat Co. on the W. O. Kincaid and others farm.

In Nicholas County, Hope Natural Gas Co. is building a rig for No. 7806 Thompson Coal Land Co. in Jefferson district and is down 125 feet in No. 7794 Lewis Land & Coal Co. and at 2,780 feet in No. 7795 Federal Coal Co.

Central West Fields

(Continued from Page 106)

Carter Oil Co. No. 1 W. T. Cox, SE SE SW section 14-4n-5e, small showing of oil at 3,978-4,000 feet, drilling at 4,036 feet in black shale.

Effingham County: Kingwood Oil Co. No. 1 McWhorter, C E half SE NW section 15-6n-6e, drilling at 3,852 feet.

Christian County: Indiana Producing & Refining Co. No. 1 Warren, SW SW SW section 23-11n-1e, drilling at 824 feet.

Champaign County: Casey & Edwards No. 1 Mohr, SW cor. section 9-17-10e, sand at 665-70 feet, hole full of water and a small showing of oil.

Piatt County: Max Pray and others No. 1 Baker, SW NE NE section 12-18n-6e, drilling at 366 feet.

Edgar County: Sun Oil Co. No. 1 Goodwin, C W half NE SE section 22-13n-12w, Devonian lime at 2,209 feet, salt and sulfur water at 2,235-47 feet, pulling 7-inch pipe to ream down and deepen.

EASTERN KENTUCKY OPERATIONS

ASHLAND, Ky., May 23.—Two small oil wells and one gas completion are included in the field reports of Eastern Kentucky this week.

J. C. Ellis No. 2 on the C. B. Tipton farm on Billie's Fork in the Big Sinking district of Lee County was completed at 465 feet, a 5-bbl. well.

C. J. Supple & Co. No. 7 William Salyer, on Birch Branch in the Burning Fork district of Magoffin County, hit sand at 1,080 feet and cored 39 feet, then finished at 1,122 feet. The well was shot and is showing for a 5-bbl. producer.

The Kentucky-West Virginia Gas Co. No. 570, Clarence Neeley land, on Home Branch of Buffalo Creek in Floyd County, was completed at 2,705 feet and has a daily gas flow of 83,000 feet. The same company drilled a dry hole in No. 569, nearby, and is plugging it.

In Floyd County, the Kentucky-West Virginia Gas Co. is down 620 feet, in sand, in No. 567 M. Slone and M. D. Slone, on Levisa Fork, with drilling continuing in sand. The same firm had reached the 495-foot level in slate in No. 572 G. W. Taylor, on Home Branch of Buffalo Creek. Inland Gas Corp. is down 1,253 feet, in sand, in No. 200, on Layne heirs land on Toms Creek.

In Martin County, Kentucky-West Virginia Gas Co. was drilling at 875 feet, in sand, in No. 5240 on C. W. Preece Land on Coldwater Fork and completed No. 5241 on the same land at a total depth of 1,321 feet in slate but production figures are not available. The same firm is grading road to No. 5242, also on the Preece land.

In Pike County, Inland Gas Corp. was at 1,237 feet in No. 199, Helen Leslie land on Hammond Branch of Levisa Fork.

In Knott County, Inland Gas Co. was drilling at 2,778 feet in No. 198, on Maryland Beverly land, on Right Beaver.

In Lee County, South Penn Oil Co. was drilling at 360 feet in No. 109, Flahaven Land Co., on Big Sinking. In Big Sinking district, Price Fraley has started drilling No. 1, on Flahaven Land Co. 500 acres. Virginia Gas & Oil Co. has reached the 700-foot mark in No. 3 E. S. Moore on Little Sinking.

In Elliott County, C. M. Nicholas was drilling at 400 feet in No. 1 on Joe Ison farm at Isonville.

Rocky Mountain Area

(Continued from Page 99)

Cane Creek Oil Co. No. 1 Govt., NW SW sec. 31-26n-21e. Drlg. below 1,600 ft.

Summit County

Longwell Pet. Co. No. 1, SE SW SE sec. 35-3n-5e. Drlg. 2,792 ft.; S.S.G.

NEBRASKA

Keith County

Twentieth Century Oil Co. No. 1 Stuken, C NW NW sec. 21-14n-37w. Res. at 1,050 ft.; C.D.

Sioux County

Union Oil Co. of Calif. No. 1 Agate-15, NW SE SE sec. 15-28n-55w. Drlg. below 5,000 ft. in 9-in. hole.

NORTH DAKOTA

Williams County

California Co. No. 1 Kamp, C NW NE sec. 3-154n-96w. Drlg. 7,935 ft.

Canadian Fields

Completions and Operations in Northwest and in Ontario

By VICTOR LAURISTON

CHATHAM, Ontario, May 21.—Crude oil and naphtha production from all Alberta fields in March totaled 467,732 bbls., daily average 15,088 bbls., compared with 401,587 bbls., daily average 14,342 bbls. in February. Turner Valley limestone production for the month increased from 397,163 to 463,258 bbls., shallow crude from 652 to 808 bbls.

Official figures show that Turner Valley, despite 42 per cent proration, produced 1,302,855 bbls. in the first three months of 1938; while production for all Alberta reached 1,313,515 bbls.

Pipe line runs from Turner Valley to the Imperial and British American refineries in April totaled 379,213 bbls., compared with 406,644 bbls. in March. The decline was largely due to limiting of production to six days a week, instituted on April 1. Deliveries to Imperial Oil Refineries in April included 28,311 bbls. of naphtha and 234,508 bbls. of crude. British American Oil Co. took 552 bbls. of naphtha and 115,842 bbls. of crude.

Turner Valley Producers

In section 32-18-2w5, on the Turner Valley west flank, West Turner Petroleums No. 1, LSD 2, which was given a provisional potential of 1,318 bbls. per day before acidizing, is finishing tests for a new potential after acidization. Open flow is reported as high as 4,320 bbls. a day. The new aggregate potential of Brown Oil Corp. Nos. 1, 2 and 4 has been placed at 4,216 bbls., with allowable of 1,855 bbls. Brown Oil Corp. No. 2, LSD 8, section 20-18-2w5, with previous potential of 1,006 bbls., developed 1,726 bbls., open flow. Potential was set at 1,151 bbls. with 506 bbls. allowable. Sunset Oils No. 1, LSD 10, same section, developed 2,564 bbls. open flow after acidizing. Potential was set at 1,710 bbls. with 752 bbls. allowable.

Total crude potential for the field is now 32,438 bbls. a day.

Tests in the Lime

In the far south end of the field, National Petroleum Corp. No. 2, LSD 14, section 9-18-2w5, which discontinued drilling to test production at 7,559 feet after getting the Madison at 7,070 feet, feet, has resumed deepening, using oil as rotary fluid. The black lime horizon which is regarded as the limit of possible production, is expected around 7,700 feet.

In section 17-18-2w5, Sundance Royalties No. 1, LSD 9, is below 7,259 feet after getting Madison limestone at 6,942 feet. In section 29-18-2w5, Model-Spooner-Reward No. 2, S half LSD 1, is below 6,990 feet after getting Madison at 6,734 feet. It will change to cable tools before entering the main producing zone.

In section 21-18-2w5, Barsac Royalties No. 1, LSD 12, got the Madison lime at 6,406 feet and is preparing to resume after cementing casing. In section 29-18-2w5, Globe Royalties No. 1, LSD 7, got the limestone at 6,952 feet and is cementing 6-inch casing at 6,977 feet. It logged closely with Commoil No. 1 producer a half mile to the north. In section 32-18-2w5, Royalite Oil Co. No. 30, LSD 11, got the limestone at 7,220 feet and cemented casing at 7,235 feet. Location is a quarter mile west of previous outlying west flank producers, and preparations are being made to handle heavy production.

West Flank Drilling

In section 5-19-2w5, west central Turner Valley, Vulcan-Brown Petroleums No. 1, LSD 10, is below 6,913 feet. Royalite Oil Co. No. 33, LSD 2, is below 1,135 feet after cementing surface casing.

In section 32-18-2w5, Vantage Oils No. 1. S half LSD 11, offsetting Royalite No. 30 to the west is working on cellar. Davies Petroleums No. 4, LSD 10, has spudded on acreage of British Trans-Canada Oils, which holds a 30 per cent interest. West Turner No. 3, LSD 6, is below 1,200 feet. British Colonial Oils No. 1, LSD 5, is below 350 feet with standard tools and will switch to rotary around 3,000 feet.

In section 29-18-2w5, Commoil No. 2, LSD 10, is in the Benton below 3,157 feet, logging closely with No. 1 producer. Commoil No. 1, LSD 15, with potential of 2,031 bbls. a day, will be acidized. P. & H. Development Co. No. 1 Alco, LSD 13, is resuming from 100 feet. Royalite Oil Co. No. 31, LSD 6, is below 5,077 feet.

In section 20-18-2w5, United Brown Petroleums No. 5, LSD 1, is below 6,760 feet. In section 17-18-2w5, Coronation Royalties No. 1, LSD 10, is below 6,501 feet.

In section 16-18-2w5, Frontier Royalties No. 1, LSD 11, is below 6,239 feet. Rich Well Oil Co. No. 1, LSD 5, is resuming with rotary equipment after running 10-inch casing to bottom at 1,892 feet. Royal Canadian Oil Co. No. 2, LSD 4, is below 2,686 feet. Brown Oil Corp. No. 5, LSD 12, is below 322 feet. In section 9-18-2w5, Marine Petroleums No. 1, LSD 11, is below 435 feet, carrying 16-inch pipe to hold back caving. Rex Petroleums No. 1, LSD 9, is rigged. In section 5-18-2w5, Theo Grewer and associates No. 1, LSD 14, is laying gas and water lines, preparatory to deepening from 200 feet. P. & H. Development Co. No. 1 C. & E., LSD 7, is resuming from 100 feet. In section 33-17-2w5, Davies Petroleums No. 3, LSD 7, is below 3,212 feet and preparing to change to rotary equipment for deeper drilling. Firth Petroleum No. 1, LSD 6, section 16-17-2w5, is below 306 feet.

Okalta Structure

On the Okalta fold, west of the main Turner Valley structure, Okalta Oil Co. No. 6, LSD 3, section 30-18-2w5, is below 7,400 feet. It has not yet found the lime.

In section 31-18-2w5, Anglo-Canadian Oil Co. No. 1, LSD 16, has derrick up 2 miles north of Okalta No. 6 and more than a half mile nearer the proven crude area.

North Turner Valley

In North Turner Valley, Phillips Royalties No. 1, LSD 16, section 16-20-3w5, is in the Lower Benton formation below 5,100 feet and logging satisfactorily with the west flank crude producers farther south.

Home Oil Co. No. 2 Millarville, LSD 6, section 33-20-3w5, the most northerly test in the field, is below 1,715 feet.

New Tests Planned

Recent new Turner Valley locations are in the far south. In section 9-18-2w5, Calberta Oils No. 1 has been spotted in LSD 10, offsetting National Petroleum No. 2 producer to the southeast.

In section 5-18-2w5, M. & M. Exploration Co. No. 1 has been located in LSD 6, about 1½ miles south of National Petroleum No. 2.

In section 33-16-2w5, Anglo-Canadian Oil Co. No. 2 is working on cellar. Location is about 6 miles south of Davies Petroleums No. 3, the most southerly drilling well, and about 8 miles south of National Petroleum No. 2, the most southerly well to prove the limestone.

Potential Rules Revised

New regulations respecting tests to determine Turner Valley crude potentials have been announced by the Alberta Lands and Mines Department. An old well wishing to acidize and be re-tested must operate for a 10-day period at not less than 36 per cent of the last potential and on the eleventh day shall be operated for a 24-hour period with unrestricted flow. Potential shall be considered 66⅔ per cent of this last day's flow.

New wells will be given a temporary allowable based on the average of the first three-day production; and for the last 10 days of the first 30 days on production shall be operated continuously at not less than 36 per cent of the temporary potential. Following this a 24-hour unrestricted flow test shall be made, the new potential being 66⅔ per cent of this open flow.

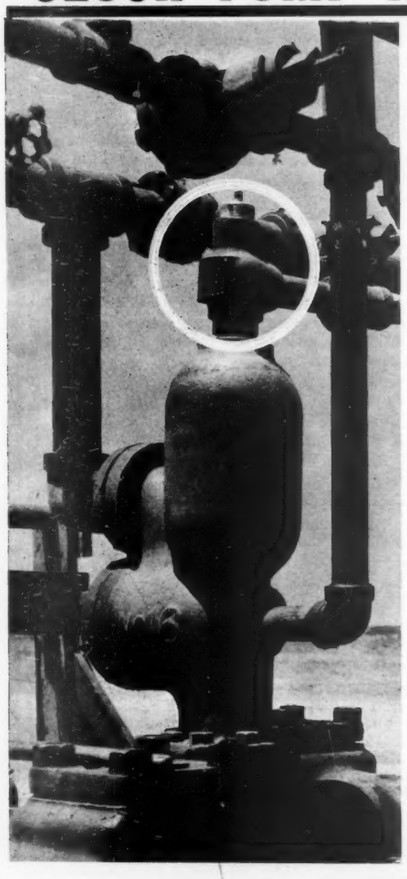
Wells may be acidized at any time prior to the 10-day period preceding the 24-hour open flow test.

Tests in the Foothills

On the Brazeau structure in the northern foothills west of Edmonton, Home Oil Co. No. 1 Brazeau, LSD 16, section 7-43-17w5, is below 3,910 feet.

(Continued on Page 120)

SLUSH PUMP INSURANCE



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WILDCAT OPERATIONS

CALIFORNIA

IMPORTANT WELLS AND NORTHERN CALIFORNIA WILDCATS

Company, well, location, and county—	S. T. R.	Depth	Status—
Wilshire Oil, No. 1 Gaviota, Santa Barbara	35- 5-33	3,820	gr. sd .drlg.
General Pet., No. 18 Erburu, Capitan, Santa Barbara	32- 5-30	994	sd. sh. drlg.
General Pet., No. 22 Erburu, Capitan, Santa Barbara	32- 5-30	1,400	pump 140 b.d.
South Crude Oil, No. 2-191, Coal Oil Point, S. Barb.	tideland	5,510	P.B. 500
Ohio Oil, No. 1 Morrison, Santa Maria, Santa Barbara	27-10-34	5,198	sd. sh. drlg.
Hancock-Bush, No. 2 Bradley, Santa Maria, S. Barb.	26-10-34	5,030	sd. sh. drlg.
Bankline Oil, No. 1 Silva, Santa Maria, Santa Barbara	7- 9-33	4,351	sd. sh. drlg.
Pacific West. Oil, No. 1 Car., Santa Maria, Santa Barb.	28-10-34	1,975	sd. sh. drlg.
Cal. Lands, Inc., No. 4 Gallison, Santa Maria, S. Barb.	26-10-34	5,330	pump 450 bd.
Moore, E. H., No. 1-F Sugar, Santa Maria, Santa Barb.	19-10-34	4,663	sd. sh. drlg.
G. & B. Oil, No. 1 B. & G., Santa Maria, Santa Barb.	26-10-34	4,150	sd. sh. drlg.
Selegna Oil, No. 1 S. M., Santa Maria, Santa Barbara	26-10-34	3,697	sd. sh. drlg.
Signal Oil, No. 12 Yelkin, Santa Maria, Santa Barbara	26-10-34	3,191	sd. sh. drlg.
Union Oil, No. 1 McCoy, Santa Maria, Santa Barbara	27-10-34	4,486	sd. sh. drlg.
Union Oil, No. 3 LeRoy, Santa Maria, Santa Barbara	24-10-35	5,395	sd. sh. drlg.
Union Oil, No. 2-2 O'Donnell, Santa Maria, S. Barb.	20-10-34	5,120	sd. sh .drlg.
Union Oil, No. 3 Bradley, Santa Maria, Santa Barbara	25-10-34	4,790	sd. sh. drlg.
Wilson Oil, No. 1-B, Santa Maria, Santa Barbara	26-10-34	5,373	fish. tubing
Sunshine Oil, No. 4 Wallace, Santa Maria, S. Barbara	27-10-34	4,228	sd. sh. drlg.
Jones, F. E., No. 2 Wisconsin, Santa Maria, S. Barb.	27-10-34	4,657	cleaning out
Standard Oil, No. 1 Cat Canyon, Santa Barbara	27- 9-33	5,529	redrlg. 5,265
O'Donnell, J. E., No. 1 Helen, Santa Barbara	8- 7-33	1,159	sd. sh. drlg.
Douglas Oil, No. 1 Los Alamos, Santa Barbara	8- 8-33	1,866	sd. sh. drlg.
United West. Oil, No. 1, Los Olivos, Santa Barbara	16- 7-30	3,145	hd. sd. drlg.
High Mesa Oil, No. 1 Butcher, Ojai, Ventura	16- 4-22	1,420	sd. sh. drlg.
St. Louis Oil, No. 1 Pirie, Ojai, Ventura	18- 4-22	2,711	cleaning out
Rowe, W. G., No. 1 Johnson, Oxnard, Ventura	15- 1-22	4,475	fish. D.P.
Texas Co., No. 5 Yale, South Mountain, Ventura	13- 3-21	4,730	gr. sd. drlg.
Merchants Pet., No. 8 Sespe, Ventura	1- 4-20	561	sd. sh. drlg.
Claran, F. E., No. 1 Hardison, Sespe, Ventura	22- 4-20	394	hd. sd. drlg.
Continental Oil, No. 1 Elkins, Hopper Canyon, Vent.	23- 4-19	4,170	hd. sh. drlg.
C. C. M. Oil, No. 21 Hobson, Rincon, Ventura	8- 3-24	2,591	sd. sh. drlg.
C. C. M. Oil, No. 22 Hobson, Rincon, Ventura	17- 3-24	4,500	cleaning out
Richfield Oil, No. 6-F Hobson, Rincon, Ventura	17- 3-24	2,580	flow 240 b.d.
Tide Water A. O., No. 19 V.L.W., Ventura Ave., Vent.	26- 3-23	8,710	O.S. drlg.
Tide Water A. O., No. 75 Lloyd, Ventura Ave., Vent.	26- 3-23	3,753	sd. sh. drlg.
Tide Water A. O., No. 76 Lloyd, Ventura Ave., Vent.	27- 3-23	4,850	recmtd. 4,841
Tide Water A. O., No. 111 Lloyd, Ventura Ave., Vent.	27- 3-23	7,144	cleaning out
Tide Water A. O., No. 127 Lloyd, Ventura Ave., Vent.	27- 3-23	4,476	sd. sh. drlg.
Tide Water A. O., No. 7 Hartman, Ventura Ave., Vent.	22- 3-23	952	cmtd. 797
Tide Water A. O., No. 11 McGonigle, Vent. Ave., Vent.	23- 3-23	5,650	sd. sh. drlg.
Shell Oil, No. 94 Taylor, Ventura Ave., Ventura	20- 3-23	8,710	O.S. drlg.
Shell Oil, No. 31 Edison, Ventura Ave., Ventura	20- 3-23	5,486	sd. sh. drlg.
Shell Oil, No. 37 Gosnell, Ventura Ave., Ventura	28- 3-23	7,655	sd. sh. drlg.
General Pet., No. 13 Notten, Ventura Ave., Ventura	28- 3-23	9,871	P.B. 8,948
Lloyd Corp., No. 1 Dabney-Lloyd, Ventura Ave., Vent.	24- 3-23	6,698	sd. sh. drlg.
Amerada Pet., No. 5 Beer, Devils Den, Kern	22-26-19	8,297	hd. sh. drlg.
Gibson Oil, No. 3 Alferitz, Devils Den, Kern	14-25-18	420	sd. sh. drlg.
Franco-Western Oil, No. 15, McKittrick, Kern	8-30-22	237	sd. sh. drlg.
Leyse & Sonne, No. 1 Pasadena, McKittrick, Kern	28-30-22	1,790	sd. sh. drlg.
Chico-Martinez Oil, No. 1 Holly, South Belridge, Kern	1-29-20	840	sd. sh. drlg.
Par-Mex Oil, No. 1 Kenden, South Belridge, Kern	25-29-20	695	sd. sh. drlg.
Randan Pet., No. 1 Theta, Lost Hills, Kern	3-26-20	1,625	cmtd. 1,535
Belridge Oil, No. 27-5 North Belridge, Kern	27-27-20	6,013	br. sh. drlg.
Belridge Oil, No. 27-6 North Belridge, Kern	27-27-20	8,400	swabing
Belridge Oil, No. 35-26 North Belridge, Kern	35-27-20	7,670	br. sh. drlg.
Tide Water A. O., No. 3-21 North Belridge, Kern	21-27-20	5,795	br. sh. drlg.
Richfield Oil, No. 2 North Belridge, Kern	22-27-20	5,497	br. sh. drlg.
Texas Co., No. 3 Martin, North Belridge, Kern	22-27-20	8,196	O.S. drlg.
Texas Co., No. 4 Martin, North Belridge, Kern	22-27-20	5,650	br. sh. drlg.
General Pet., No. 1 St. Helens, Belridge, Kern	12-28-20	8,685	P.B. 1,400
Pan-May Oil, No. 1 Coffee, Round Mountain, Kern	31-27-29	958	hd. sd. drlg.
Crestmont Oil, No. 3 Staley, Round Mountain, Kern	8-28-29	1,682	pump 61 b.d.
Shell Oil, No. 17 Freeman, Round Mountain, Kern	20-28-29	1,482	sd. sh. drlg.
Shell Oil, No. 19 Freeman, Round Mountain, Kern	20-28-29	1,830	pump 1,785 b.d.
Rubenstein, A. B., No. 1 Lerdo, Kern	20-28-27	3,302	pump water
Helm & Smith, No. 3-A Kernco, Kern River, Kern	34-28-28	615	O.S. drlg.
Hast Oil, No. 1 Kern, Kern River, Kern	34-28-28	358	O.S. drlg.
Shell Oil, No. 1 Durnal, Adobe Canyon, Kern	24-27-28	953	sd. sh. drlg.
Carter, J. P., No. 2 S.P.L., Mount Poso, Kern	3-27-28	1,456	pump 30 b.d.
Shell Oil, No. 6-A Mathews, Mount Poso, Kern	4-27-28	1,671	pump 160 b.d.
Shell Oil, No. 23 Security, Mount Poso, Kern	16-27-28	1,675	sd. sh. drlg.
Bargol Oil, No. 2 Claflin, Mount Poso, Kern	10-27-27	2,210	P.B. 1,307
Framac Oil, No. 3 Brown, Mount Poso, Kern	22-27-27	1,351	cleaning out
Reynolds Oil, No. 1 Premier, Mount Poso, Kern	30-27-27	2,850	P.B. 2,704
Master Pet., No. 3 Recovery, Mount Poso, Kern	33-26-28	1,599	idle
Vanguard Oil, No. 30 Baker, Mount Poso, Kern	33-27-28	1,567	sd. sh. drlg.
Ring Oil, No. 3 Loudon, Mount Poso, Kern	32-26-28	1,710	pump 205 b.d.
Western Gulf Oil, No. 35 KCL, Fruitvale, Kern	14-29-27	3,013	flow 410 b.d.
Union Oil, No. 1 Berry, Arvin, Kern	15-31-29	6,812	redrlg. 6,135
Seaboard Oil, No. 1 KCL, Wasco, Kern	26-27-24	10,243	will deepen
Superior Oil, No. 3 Wagner, Rio Bravo, Kern	35-28-25	11,248	sd. sh. drlg.
Superior Oil, No. 4 Wagner, Rio Bravo, Kern	35-28-25	8,990	sd. sh. drlg.
Superior Oil, No. 2 Geissinger, Bravo, Kern	35-28-25	7,080	sd. sh. drlg.
Superior Oil, No. 1 Anderson, Rio Bravo, Kern	35-28-25	9,698	sd. sh. drlg.
Union Oil, No. 2-34 KCL, Rio Bravo, Kern	34-28-25	11,204	fish tubing
Union Oil, No. 3-34 KCL, Rio Bravo, Kern	34-28-25	6,997	sd. sh. drlg.
Getty Oil, No. 1 Ramsey, Rio Bravo, Kern	35-28-25	11,509	flow 6,150 b.d.
Getty Oil, No. 2 Ramsey, Rio Bravo, Kern	35-28-25	162	sd. sh. drlg.
General Pet., No. 1 Wagoner, Rio Bravo, Kern	35-28-25	10,192	redrlg. 7,680
General Pet., No. 2 Wagoner, Rio Bravo, Kern	35-28-25	10,225	sd. sh. drlg.
Standard Oil, No. 18-1 KCL, Una, Kern	29-28-26	7,831	sd. sh. drlg.
Shell Oil, No. 83-35 KCL, McFarland, Kern	35-26-25	4,230	sd. sh. drlg.
Harp Bros., No. 1 Armstrong, McFarland, Kern	9-26-26	1,205	cleaning out
Dilmar Oil, No. 1 Quinn, Jasmin, Kern	15-25-27	2,956	P.B. 2,875
Standard Oil, No. 11-2 KCL, Greeley, Kern	20-29-26	11,520	O.S. drlg.
Standard Oil, No. 1 Ross, Greeley, Kern	20-29-26	8,109	dry; abd.
Continental Oil, No. 1-E KCL, Stevens, Kern	17-30-26	8,252	O.S. drlg.
Standard Oil, No. 15-2 KCL, Canfield Ranch, Kern	27-30-26	2,195	sd. sh. drlg.
Shell Oil, No. 34-30-A KCL, Ten Section, Kern	30-30-26	8,200	O.S. drlg.
Shell Oil, No. 47-30-B KCL, Ten Section, Kern	30-30-26	7,667	sd. sh. drlg.
Shell Oil, No. 58-30-B KCL, Ten Section, Kern	30-30-26	6,790	sd. sh. drlg.
Shell Oil, No. 21-32-B KCL, Ten Section, Kern	32-30-26	8,220	O.S. drlg.
Shell Oil, No. 32-13-A KCL, Canal, Kern	13-30-25	4,896	sd. sh. drlg.
Ohio Oil, No. 6-E KCL, Canal, Kern	14-30-25	7,935	sd. sh. drlg.
Ohio Oil, No 8-A KCL. Buena Vista Lake, Kern	32-31-26	10,310	sd. sh. drlg.
Berry & Ewing, No. 2 Midway-Sunset, Kern	31-32-24	1,221	O.S. drlg.
Texas Co., No. 1 Pioneer, Midway-Sunset Kern	33-11-23	8,461	fish collar
Sailing Oil, No. 9 Midway-Sunset, Kern	2-11-24	970	P.B. 850
A.B.S. Corp., No. 12 Lewis, Sunset, Kern	20-11-23	3,890	swabbing
Ohio Oil, No. 3-D, Tejon Ranch, Kern	28-11-18	468	sd. sh. drlg.
Shell Oil, No. 4-26 KCL, San Emidio, Kern	26-11-22	9,385	sd. sh. drlg.
Richfield Oil, No. 1 KCL, Wheeler Ridge, Kern	28-11-20	2,097	sd. sh. drlg.
Pure Oil, No. 1 SPL, Santua, Fresno	31-18-17	10,862	fish D.P.
Gauthier, J., No. 3 Hubbard, Panoche Creek, Fresno	12-14-11	362	idle
Pet. Sec., No. 2 Gatchell, Jacalitos, Fresno	18-20-16	6,850	cmtd. 6,700
Dauphin Dev., No. 1 Boone, Alcalde, Fresno	30-21-14	3,778	fish D.P.
Wilcox, J. F., No. 6, Coalinga, Fresno	11-20-14	426	sd. sh. drlg.
K. N. D. A., No. 67-20-J Kettleman North, Fresno	20-21-17	10,680	sd. sh. drlg.
K. N. D. A., No. 6-8-Q Kettleman North, Kings	6-22-18	8,420	gr. sd. drlg.
K. N. D. A., No. 38-8-Q Kettleman North, Kings	8-22-18	8,513	gr. sd. drlg.
K. N. D. A., No. 27-16-Q Kettleman North, Kings	16-22-18	5,998	br. sh. drlg.
K. N. D. A., No. 58-16-Q Kettleman North, Kings	16-22-18	7,054	gr. sd. drlg.
K. N. D. A., No. 47-18-Q Kettleman North, Kings	18-22-18	8,004	gr. sd. drlg.
K. N. D. A., No. 43-20-Q Kettleman North, Kings	20-22-18	7,072	gr. sd. drlg.
K. N. D. A., No. 27-22-Q Kettleman North, Kings	22-22-18	5,285	sd. sh. drlg.
Standard Oil, No. 46-13-H Kettleman North, Fresno	13-21-16	10,200	sd. sh. drlg.
Standard Oil, No. 27-21-J Kettleman North, Fresno	21-21-17	10,920	P.B. 10,800
Standard Oil, No. 58-33-J Kettleman North, Fresno	33-21-17	8,025	gr. sd. drlg.
Standard Oil, No. 2-11-P Kettleman North, Kings	11-22-17	8,380	completing
Standard Oil, No. 78-1-P Kettleman North, Kings	1-22-17	6,390	sd. sh. drlg.
Standard Oil, No. 87-1-P Kettleman North, Kings	1-22-17	8,045	flow 1,894 b.d.
Standard Oil, No. 21-13-P Kettleman North, Kings	13-22-17	7,248	redrlg. 6,020
Standard Oil, No. 74-7-Q Kettleman North, Kings	7-22-18	6,858	sd. sh. drlg.
Standard Oil, No. 85-7-Q Kettleman North, Kings	7-22-18	7,987	sd. sh. drlg.

KEY TO ABBREVIATIONS USED IN DRILLING REPORTS

Abd., abandoned.
Acd., acidized.
B.O., barrels of oil.
B.P.D., barrels per day.
B.D., barrels daily.
B.P., back pressure.
B.R., building rig.
Br. sh., brown shale.
B.S., basic sediment.
Cd. or Crd., cored.
C.D., corrected depth.
Cg., coring.
Cmtd., cemented.
C.O., cleaning out.
Comp., completed.
Compr., compressor.
C.P., casing pressure, also cement through perforations.
Csg., casing.
D.D., drilling (or drilled) deeper.
Drlg. or Drg., drilling.
Drk. or Dk., derrick.
D.S., drill stem.
D.&A., dry and abandoned.
Fsg., fishing.
Gbo., gumbo.
G.I., gas injection.
Gr., gravity.
Gr. sd., gray sand.
Grn. sh., green shale.
Hd. sd., hard sand.
H.F.W., hole full of water.
I.P., initial production.
L., lime.
L.D.D., later drilled deeper.
Lnr., liner.
Loc., location.
M.I.M., moving in material.
M.I.R., moving in rig.
M.I.R.T., moving in rotary tools.
M.O.T., milling on tools.
O.I.H., oil in hole.
O.S., oil sand.
O.T.D., old total depth.
O.W.D.D., old well drilling deeper.
O.W.P.B., old well plugging back.
P.B., plugging or plugged back.
P.B.P., pulling or pulled big pipe.
P.L., pipe line.
P.L.O., pipe line oil.
Pmpg., pumping.
P.O.P., putting on pump.
P.P., pulled pipe.
Rd. sd., red sand.
Rd. sh., red shale.
Recmt., recemented.
Rmg., reaming.
Redrlg., redrilling.
Rng., running.
R.O.G., rig on ground.
R.P., rock pressure.
R.U., rigging up.
R.U.R., rigging up rotary.
R.U.S.T., rigging up standard tools.
R.&T., rods and tubing.
S. or Sd., sand.
S.D., shut down.
Sdy. sh., sandy shale.
Sdtr., or St. sidetracking.
S.D.P.L., shut down for pipe line.
S.D.O., or S.D.W.O., shut down awaiting orders.
S.G., show gas.
Sh.&L., shale and lime.
S.I., shut in.
S.I.P., shut in, prorated.
S.L.M., steel line measurement.
S.O., show oil.
S.O.G.&W., show of oil, gas and water.
Spdg. or Spd., spudding.
S.R., straightreaming.
Stdg., standardizing (also standing).
S.W., salt water.
Swbg., swabbing.
T.A., temporarily abandoned.
Tbg., tubing.
T.D., total depth.
T.P., tubing pressure.
Tr., tract.
U.R., underreaming.
W.I.H., water in hole.
W.O., workover.
W.O.C. or W.O.C.S., waiting for cement to set.
W.P., working pressure.
W.S.O., water shutoff.
W.S.S.O.K., water shutoff O.K.
W.S.O.N.G., water shutoff no good.
W.S.R. or W.O.S.R., awaiting standard rig.
Wtr., water.

Standard Oil, No. 61-21-Q Kettleman North, Kings	21-22-18	2,780	sd. sh. drlg.
Cal. Pet. Prod., No. 1 Elkhorn, San Luis Obispo	6-10-25	1,580	will deepen
Hancock Oil, No. 1 Dick, Huasna, San Luis Obispo	30-12-33	3,361	will deepen
West. Plains Oil, No. 2 Panorama Hills, S. L. Obispo	2-32-21	2,425	deepening
Baringer & Gould, No. 2 Sears, Ducor, Tulare	29-24-28	818	sd. sh. drlg.
Crusaders Oil, No. 1 Ducor, Tulare	1-24-27	82	sd. sh. drlg.
Caminol Co., No. 3 A. O. B., Allensworth, Tulare	29-24-24	7,555	will deepen
Wilshire Oil, No. 1 Cowell, Half Moon Bay, San Mateo	20- 6- 5	8,030	P.B. 2,525
Ohio Oil, No. 1-A Willard, Willows, Glenn	18-20- 2	3,586	sd. sh. drlg.
Richfield Oil, No. 1 Potrero Hills, Solano	10- 4- 1	3,250	blew out
Amerada Pet., No. 2 S.S.J., Rio Vista, Solano	18- 4- 3	3,596	sd. sh. drlg.

IMPORTANT WELLS AND SOUTHERN CALIFORNIA WILDCATS

Company, well, location, and county—	S. T. R.	Depth	Status—
Basin Oil, No. 1, Potrero, Los Angeles	34- 2-14	4,740	sd. sh. drlg.
Ohio Oil, No. 12 Gough, El Segundo, Los Angeles	7- 3-14	7,031	sd. sh. drlg.
Apex Pet., No. 3 Elsie, El Segundo, Los Angeles	12- 3-15	3,632	sd. sh. drlg.
Sovereign Oil, No. 2, El Segundo, Los Angeles	12- 3-15	2,780	sd. sh. drlg.
Treasure Oil, No. 3, Playa Del Rey, Los Angeles	21- 2-15	6,150	deepening
D. & B. Oil, No. 1, Lomita, Los Angeles	30- 4-13	5,020	sd. sh. drlg.
Patton-Conway, No. 1 fee, Torrance, Los Angeles	15- 4-14	3,760	cleaning out
McCaslin, W. E., No. 1 Whitney, Torrance, L. A.	23- 4-14	4,796	sd. sh. drlg.
Grubbs & Main, No. 1 Lyman, Torrance, Los Angeles	14- 4-14	3,798	cleaning out
Albertson Oil, No. 2, Torrance, Los Angeles	14- 4-14	3,580	redrlg. 890
Anderson, N. H., No. 1, Torrance, Los Angeles	15- 4-14	4,956	sd. sh. drlg.
McDonald & Burns, No. 5 Moore, Torrance, L. A.	23- 4-14	4,472	sd. sh. drlg.
McDonald & Burns, No. 8 Moore, Torrance, L. A.	22- 4-14	4,680	sd. sh. drlg.
Emerald Oil, No. 1 fee, Torrance, Los Angeles	23- 4-14	5,120	pump 25 b.d.
Camp, C. W., No. 12 Torrance, Los Angeles	23- 4-14	5,017	sd. sh. drlg.
Doyle Pet., No. 2 Neill, Torrance, Los Angeles	23- 4-14	4,998	pump 90 b.d.
Doyle Pet., No. 3-A Getty, Torrance, Los Angeles	14- 4-14	5,015	sd. sh. drlg.
Elexico Oil, No. 1 Allen, Torrance, Los Angeles	23- 4-14	1,061	sd. sh. drlg.
Charleston Oil, No. 1 Marcoux, Torrance, Los Angeles	23- 4-14	1,000	cmtd. 1,000
Marel Oil, No. 1 Leaver, Torrance, Los Angeles	14- 4-14	5,025	sd. sh. drlg.
Kelley, F. C., No. 1 Wilson, Torrance, Los Angeles	14- 4-14	3,750	rebldg. rig
Krause & Baker, No. 2 Gladys, Torrance, Los Angeles	14- 4-14	3,795	rigged up
Peters Royalty, No. 1, Torrance, Los Angeles	14- 4-14	5,023	sd. sh. drlg.
Consolidated Pet. Co., No. 1, Torrance, Los Angeles	15- 4-14	4,899	sd. sh. drlg.
Texas Co., No. 9 Wilson, Torrance, Los Angeles	15- 4-14	4,280	sd. sh. drlg.
Texas Co., No. 11 Wilson, Torrance, Los Angeles	14- 4-14	2,994	sd. sh. drlg.
Wilson, R. K., No. 1 Cook, Torrance, Los Angeles	14- 4-14	4,997	sd. sh. drlg.
Star Pet. Co., No. 1 G & A, Torrance, Los Angeles	23- 4-14	3,751	cleaning out
Standard Oil, No. 1 Martin, Torrance, Los Angeles	15- 4-14	4,950	pump 296 b.d.
Superior Oil, No. 6, Torrance, Los Angeles	14- 4-14	4,970	cmtd. 4,966
Imperial Gypsum, No. 1 De Witt, Torrance, L. A.	14- 4-14	5,002	sd. sh. drlg.
Imperial Gypsum, No. 2 Getty, Torrance, L. A.	14- 4-14	3,785	rigged up
C. C. M. O. Co., No. 8, Torrance, Los Angeles	15- 4-14	3,890	rigging up
C. C. M. O. Co., No. 13, Torrance, Los Angeles	15- 4-14	3,723	cleaning out
C. C. M. O. Co. No. 23, Torrance, Los Angeles	14- 4-14	5,023	casing leak
Berken Oil, No. 1 Star, Torrance, Los Angeles	15- 4-14	4,998	milling
Shell Oil, No. 94 Reyes, Dominguez, Los Angeles	33- 3-13	7,460	flow 140 b.d.
Stabler, W., No. 2 Marland, Dominguez, Los Angeles	3- 4-13	4,286	deepening
Union Oil, No. 58 Callender, Dominguez, Los Angeles	33- 3-13	7,549	redrlg. 4,180
Barnsdall Oil, No. 3 Trust, Rosecrans, Los Angeles	18- 3-13	7,380	O.S. drlg.
Union Oil, No. 19 Rosecrans, Rosecrans, L. A.	18- 3-13	7,633	flow 1,025 b.d.
Union Oil, No. 20 Rosecrans, Rosecrans, Los Angeles	18- 3-13	3,006	sd. sh. drlg.
Universal Consd., No. 3 Trust, Rosecrans, L. Angeles	18- 3-13	5,880	sd. sh. drlg.
Howard Oil, No. 1 Gordon, Rosecrans, Los Angeles	19- 3-13	6,596	redrlg. 5,295
Superior Oil, No. 8 Maxwell, Rosecrans, Los Angeles	19- 3-13	6,798	sd. sh. drlg.
H. B. Oil, No. 1 Stephens, Rosecrans, Los Angeles	19- 3-13	6,033	idle
Barnsdall Oil, No. 3 S.F., Newhall, Los Angeles	26- 4-17	5,197	sd. sh. drlg.
Royal Lands, No. 1, Ramona, Los Angeles	8- 4-17	615	sd. sh. drlg.
General Pet., No. 30 Ford, Wilmington, Los Angeles	4- 5-13	2,950	flow 895 b.d.
General Pet., No. 8 Harbor, Wilmington, Los Angeles	2- 5-13	2,960	flow 190 b.d.
General Pet., No. 12 Harbor, Wilmington, L. Angeles	2- 5-13	1,941	sd. sh. drlg.
General Pet., No. 14 Harbor, Wilmington, L. Angeles	2- 5-13	3,920	flow 2,195 b.d.
General Pet. Corp., No. 3-S.P., Wilmington, L. A.	2- 5-13	4,125	O.S. drlg.
Caleb Pet., No. 1 F.H., Wilmington, Los Angeles	32- 4-13	3,650	rig to pump
Hogan Pet., No. 3 Graham, Wilmington, L. A.	2- 5-13	2,196	sd. sh. drlg.
Hancock Oil, No. 4-A, Wilmington, Los Angeles	3- 5-13	2,370	sd. sh. drlg.
Hancock Oil, No. 11-B, Wilmington, Los Angeles	2- 5-13	4,050	O.S. drlg.
Hancock Oil, No. 16-B, Wilmington, Los Angeles	2- 5-13	4,040	O.S. drlg.
Hancock Oil, No. 17-O, Wilmington, Los Angeles	2- 5-13	3,010	flow 480 b.d.
Hollywood Oil, No. 1 Baxter, Wilmington, L. A.	2- 5-13	3,424	P.B. 3,390
Macson Oil, No. 3-55-C, Wilmington, Los Angeles	32- 4-13	2,700	sd. sh. drlg.
Richfield Oil, No. 1-G, Wilmington, Los Angeles	2- 5-13	3,012	pump 120 b.d.
Richfield Oil, No. 1-P.D., Wilmington, Los Angeles	2- 5-13	1,996	sd. sh. drlg.
Richfield Oil, No. 2-P.D., Wilmington, Los Angeles	2- 5-13	4,232	O.S. drlg.
Richfield Oil, No. 3-P.D., Wilmington, Los Angeles	2- 5-13	4,252	O.S. drlg.
Richfield Oil, No. 5-P.D., Wilmington, Los Angeles	2- 5-13	2,330	sd. sh. drlg.
Richfield Oil, No. 6-P.D., Wilmington, Los Angeles	2- 5-13	3,330	O.S. drlg.
Richfield Oil, No. 11-P.D., Wilmington, Los Angeles	2- 5-13	3,421	sd. sh. drlg.
Richfield Oil, No. 18-P.D., Wilmington, Los Angeles	2- 5-13	2,790	sd. sh. drlg.
Richfield Oil, No. 19-P.D., Wilmington, Los Angeles	2- 5-13	3,140	sd. sh. drlg.
Richfield Oil, No. 20-P.D., Wilmington, Los Angeles	2- 5-13	3,245	sd. sh. drlg.
Richfield Oil, No. 3-R.O., Wilmington, Los Angeles	2- 5-13	2,842	sd. sh. drlg.
Richfield Oil, No. 1-P.G., Wilmington, Los Angeles	2- 5-13	3,903	O.S. drlg.
Richfield Oil, No. 4-P.G., Wilmington, Los Angeles	2- 5-13	4,310	flow 2,765 b.d.
Superior Oil, No. 8 B. B., Wilmington, Los Angeles	2- 5-13	3,901	flow 1,780 b.d.
Universal Consd., No. 5 Newport, Wilmington, L. A.	2- 5-13	3,871	redrlg. 3,452
Union Pacific R.R., No. 73, Wilmington, Los Angeles	34- 4-13	3,960	O.S. drlg.
Union Pacific R.R. Co., No. 6-E, Wilmington, L. A.	3- 5-13	3,850	O.S. drlg.
Union Pacific R.R. Co., No. 7-E, Wilmington, L. A.	3- 5-13	2,475	sd. sh. drlg.
Union Pacific R.R. Co., No. 8-E, Wilmington, L. A.	3- 5-13	2,450	sd. sh. drlg.
Union Pacific R.R. Co., No. 9-E, Wilmington, L. A.	3- 5-13	2,861	sd. sh. drlg.
Union Pacific R.R. Co., No. 2-P.D., Wilmington, L. A.	3- 5-13	2,498	sd. sh. drlg.
Wilgate Oil, No. 1 Harbor, Wilmington, Los Angeles	2- 5-13	1,993	sd. sh. drlg.
Johnston Drlg., No. 1 Pico, Montebello, Los Angeles	5- 2-11	5,641	idle
St. Helens Pet., No. 25 Monterey, Montebello, L. A.	2- 2-12	5,790	flow 1,250 b.d.
St. Helens Pet., No. 26 Monterey, Montebello, L. A.	2- 2-12	5,500	sd. sh. drlg.
St. Helens Pet., No. 27 Monterey, Montebello, L. A.	2- 2-12	4,277	sd. sh. drlg.
Union Oil, No. 1 Paul Howard, Montebello, L. A.	2- 2-12	6,244	flow 850 b.d.
Union Oil, No. 1 H. & S., Montebello, Los Angeles	2- 2-12	4,297	sd. sh. drlg.
Union Oil, No. 1 Wilcox, Montebello, Los Angeles	2- 2-12	6,248	sd. sh. drlg.
Standard Oil, No. 2 Harvey, Montebello, Los Angeles	2- 2-12	5,299	sd. sh. drlg.
McVicar & Rood, No. 1 Manz, Montebello, L. A.	2- 2-12	5,780	flow 2,500 b.d.
Brookline Oil, No. 1 Drake, Montebello, L. A.	2- 2-12	4,580	sd. sh. drlg.
British American Oil, No. 1 Pico, Los Angeles	12- 2-12	4,568	form. test
Monte Cristo Oil, No. 1, Monterey Park, Los Angeles	27- 1-12	5,433	sd. sh. drlg.
Colorado Oil, No. 19, Whittier, Los Angeles	22- 2-11	2,052	P.B. 2,021
Hilldon Oil, No. 2 Poole, North Long Beach, L. A.	13- 4-13	4,167	O.S. drlg.
Hilldon Oil, No. 3 Poole, North Long Beach, L. A.	13- 4-13	2,896	sd. sh. drlg.
Hilldon Oil, No. 1-8, North Long Beach, L. A.	14- 4-13	5,876	sd. sh. drlg.
Signal Oil, No. 1 P. E., North Long Beach, L. A.	13- 4-13	3,912	reaming
Johnston Drlg., No. 33, Long Beach, Long Angeles	13- 4-13	4,085	sd. sh. drlg.
Exeter Oil, No. 2-A Clark, Long Beach, Los Angeles	24- 4-13	3,501	sd. sh. drlg.
Kramildon Oil, No. 1, Long Beach, Los Angeles	13- 4-13	6,875	idle
Dunlap Oil, No. 13, Long Beach, Los Angeles	30- 4-12	4,474	sd. sh. drlg.
Texas Co., No. 1 Wilson, Long Beach, Los Angeles	29- 4-12	3,465	fish D.P.
Winrock Oil, No. 1 Encinos, Long Beach, Los Angeles	13- 4-13	3,360	sd. sh. drlg.
Shell Oil, No. 44 Alamitos, Long Beach, Los Angeles	28- 4-12	4,970	pump 170 b.d.
Richfield Oil, No. 5-B, Long Beach, Los Angeles	13- 4-13	3,498	sd. sh. drlg.
J. E. F. Oil, No. 1 Schaaf, Huntington, Los Angeles	36- 5-11	4,518	P.B. 4,400
Texas Co., No. 3 Pearce, Huntington, Orange	2- 6-11	1,894	sd. sh. drlg.
Brea Canyon Oil, No. 48, Brea Canyon, Orange	2- 3-10	3,220	sd. sh. drlg.
Standard Oil, No. 2 Bastanchury, W. Coyote, Orange	21- 3-10	5,983	sd. sh. drlg.
Standard Oil, No. 65 Emery, W. Coyote, Orange	24- 3-11	4,174	pump 222 b.d.
Standard Oil, No. 66 Emery, W. Coyote, Orange	24- 3-11	4,175	pump 126 b.d.
Shell Oil, No. 1 Weisel, Anaheim, Orange	16- 4-10	2,884	sd. sh. drlg.
Millerand Pet., No. 1 Miller, Yorba, Orange	22- 3- 9	1,277	idle
Oliver & Owen, No. 1 Anderson, Yorba, Orange	22- 3- 9	1,350	pump water
Pearl J. Oil, No. 1 Dobashi, Yorba, Orange	21- 3- 9	1,804	O.S. drlg.
Mid-City Oil, No. 1 Day, Yorba, Orange	21- 3- 9	5,777	may deepen
Burmah Oil, No. 1 Sloan, Yorba, Orange	21- 3- 9	2,380	P.B. 2,338
Kelmar Oil, No. 1 Yorba, Orange	16- 3- 9	2,785	idle
Creager, G. C., No. 1 Day, Yorba, Orange	21- 3- 9	3,568	P.B. 2,330
Berco Oil, No. 1 Milhous, Yorba, Orange	22- 3- 9	1,750	cleaning out
Signet Oil, No. 2 Kraemer, Yorba, Orange	21- 3- 9	994	sd. sh. drlg.

KANSAS

Week Ending May 21 (Descriptions are East unless marked otherwise)

Barton County

Armer & Vernon No. 1 Seyfert, NW SW NE sec. 3-17-13w. Drlg. 1,040 ft.
Champlin Ref. Co. No. 1 Reeves, SW sec. 29-20-14. T.D. 3,565 ft.; W.O.C.
Crown Pet. Corp. No. 1 Wolf, SE SW SE sec. 36-19-12w. Drlg. 960 ft.
R. E. Day et al No. 1 Felts, SE SE NE sec. 14-16-12w. S.D. 1,875 ft.
Deep Rock Oil Co. No. 1 Drake, NW SE sec. 4-17-13w. Arb. 3,392 ft.; T.D. 3,430 ft.; D.&A.
Kessler O. & G. No. 1 Bowman, SW NE sec. 22-20-16w. Drlg. 1,500 ft.
Lario O. & G. Co. No. 1 Huline, CEL NE NE sec. 21-20-12w. T.D. 3,468 ft.; D.&A.
Price et al No. 1 Wondra, NW NE sec. 10-17-13w. T.D. 3,343 ft.; P.B. 3,342 ft.; p. 30 B.F.P.H.; 10% wtr.
Sinclair Prairie Oil Co. No. 1 Frederick, SW SW SE sec. 16-16-11w. Arb. 3,322 ft.; T.D. 3,346 ft.; set 5-in. csg. 3,322 ft.; acd.; swb. 60 B.O. and 78 B.W. in 11 hrs.
Western Kansas O. & R. Co. and Republic Nat. Gas Co. No. 1 Linsner, SW SW SE sec. 3-17-13w. W.O.C. 240 ft.

Butler County

Bennett & Abels No. 1 Glass, SE SW NW sec. 14-25-3. Drlg. 2,100 ft.
T. S. Dustin No. 1 Miley, SE NW NE sec. 17-27-5e. Drlg. 1,700 ft.

Chase County

T. D. Duffy No. 1 Leedy, NE NW NW sec. 26-22-9e. Drlg. 2,336 ft.

Coffey County

Barner & Leiker No. 1 Knapp, SE SW NW sec. 27-22-14. Drlg. 555 ft.
Western Kans. O. & R. Co. No. 1 Knapp, SW SW NW sec. 27-22-14. Spd.

Cowley County

Hutchinson O. & G. Co. No. 1-A Ketchen, SW SE SE sec. 11-35-5. Fsg. 2,100 ft.
Palmer Oil Corp. No. 1 Houser, SE NW SW sec. 13-30-3e. S.D. 2,930 ft.
Smith et al No. 1 Wilson, SE SW NW sec. 9-33-6. Drlg. 2,928 ft.

Dickinson County

Fred Franks et al No. 1 Huffman, NW NW sec. 11-13-1e. Drlg. 1,135 ft.

Ellis County

Duwe & Farris No. 1 Hadley, SE NE SE sec. 12-11-18w. Arb. L. 3,329-32 ft.; p. 213 B.O. in 4 hrs.; p. 1,266 B.O.P.D.; comp.

Ellsworth County

Cities Service et al No. 2 Schroeder "A," CNL SW sec. 29-17-9w. Drlg. 1,200 ft.

Finney County

Atlantic Ref. Co. No. 1 Nunn, C SE NE sec. 27-21-34w. R.U.S.T. 4,663 ft.

Ford County

Sinclair Prairie Oil Co. No. 1 Young, CSL NE sec. 34-27-21w. Drlg. 5,350 ft.

Greenwood County

C. C. Whitaker et al No. 1 Bressner, NW SE sec. 8-26-13e. T.D. 1,498 ft.; 1,000,000 ft. gas est.

Jackson County

Haverback et al No. 1 Marble Bank, C NE NE sec. 26-9-14. T.D. 2,018 ft.; C.O.

Jewell County

Hollingsworth Bros. No. 1 Wolfe, NE SW SE sec. 14-4s-8w. S.D. 100 ft.

Kearny County

Tri-County Gas Co. No. 3 Campbell, NE SE NE sec. 19-25-35w. T.D. 2,679 ft.; acdz.

Lane County

Phillips Pet. Co. No. 1 Kees, C SE SE sec. 3-19-30w. Rmd. to 2,500 ft.; W.O.C.

McPherson County

Darrah et al No. 1 Decker, SW SW SE sec. 12-21-2w. Arb. 3,557-61½ ft., T.D.; P.B. 2,980 ft.; drld. to 3,018 ft.; shot; 2,600,000 ft. gas.

Meade County

Barnett et al No. 1 Adams, NW SE sec. 22-34-30w. S.D. 69 ft.

Ness County

Schoeppel & Elmore No. 1 Moses, C SW NW sec. 10-18-25w. T.D. 4,322 ft.; S.O.

Pratt County

Atlantic et al No. 1 Berg, NE NW NW sec. 22-26-14w. Drlg. 3,865 ft.
Atlantic Ref. Co. No. 1 Rice, NW NE NW sec. 11-28-15w. Arb. 4,717 ft.; cd. to 4,790 ft.; T.D. 4,874 ft.; D.&A.

Reno County

Carey et al No. 1 McPheeters, NE NW sec. 22-26-8w. S.D. 4,037 ft.
McCole et al No. 1 Mathews, SW NW NW sec. 15-24-10w. Arb. 4,078 ft.; T.D. 4,084 ft.; W.I.H.; D.&A.

Rice County

Jones & Hinkle No. 1 Wesseler, SE SE NW sec. 34-18-10w. S.D. 2,485 ft.
Marylyn Oil Co. et al No. 1 Vincent, NW NW NE sec. 5-21-10w. T.D. 2,470 ft; rng. csg.

Rooks County

Carter Oil Co. No. 1 Whitford, NE NE SE sec. 12-7-17w. Drlg. 2,465 ft.
Duwe & Farris No. 1 Sutor, SW SW NE sec. 28-9-19w. S.D. 135 ft.
Graham et al No. 1 Fike, SW cor. sec. 9-9-17w. S.D. 3,384 ft.
Producers Oil Co. No. 1 Ham, SW SW NW sec. 25-7-19w. T.D. 1,000 ft.; C.O.

Rush County

Phillips Pet. Co. No. 1 John Kees, C SE SE sec. 3-19-20w. T.D. 2,500 ft.; S.D. for csg.

Russell County

Central Pet. Co. No. 1 Furthmeyer, SE sec. 22-14-15w. T.D. 3,238 ft.; C.O.
Cities Service No. 1 Becker, C W½ W½ SW sec. 21-14-14w. Drlg. 2,845 ft.
J. J. Hall No. 1 Landon, SW SE sec. 11-15-14w. T.D. 2,165 ft.; rng. csg.
S. L. Parks No. 1 Gorham, SW SW NE sec. 19-15-15w. H.F.W. 3,347-52 ft., T. D.; P.B. 3,120 ft.; swb. 210 B.O. 4½ hrs.
Phillips Pet. Co. No. 1 Miller, C NW SW sec. 29-13-14w. S.D. 2,045 ft.
R. H. Shields No. 1 Anschutz, SW SE sec. 2-14-13w. Drlg. 1,490 ft.
Smith & Unruh No. 1 Stielow, NW cor. sec. 32-11-14w. T.D. 2,552 ft.; S.D.
Web-Son O. & R. No. 1 Baxter, NW SE sec. 4-15-15w. Drlg. 1,735 ft.

Sedgwick County

Frank Hudson et al No. 1 Fulton, **NE SE** sec. 35-28-1e. Drlg. 1,858 ft.
Union O. & R. Co. et al No. 1 Howell, **SW** cor. sec. 6-29-1e. U.R. 2,843 ft.; to R.U.R.

Stafford County

Austin Drlg. Co. No. 1 Slade, NE NW sec. 35-25-12w. S.D. 955 ft.
Cardinal Oil Co. et al No. 1 Fischer, SW NW SW sec. 31-21-12w. T.D. 3,650 ft.; p. 783 B.O.P.D.; comp.
I.T.I.O. and Cities Service No. 1 Smith, SE NE sec. 31-21-12w. T.D. 3,477 ft.; D.&A.
Stanolind O. & G. Co. No. 2 Siefker, NE SE NE sec. 3-22-12w. T.D. 3,601 ft.; flwd. 19 B.O.P.H.; acdz. and p. 211 B.O. in 2 hrs.

Sumner County

Colonial Oil No. 1 Miles, SE NE NE sec. 30-30-42. T.D. 3,616 ft.; no shows; D.&A.
Hapeney et al No. 1 Evers, SE SE NE sec. 27-31-2e. O.W.D.D.; S.D. 1,960 ft.
Murphy et al No. 1 Tate, SE NW sec. 31-32-2e. Drlg. 3,383 ft.

Thomas County

Connelly et al No. 1 fee, NW SE SE sec. 4-10-35w. T.D. 132 ft.; S.D.

Woodson County

Cleveland Oil Co. et al No. 1 Fidelity.

SE SE NE sec. 34-25-15. T.D. 1,431 ft.; est. 10 H.O.P.D.; C.O.

Hill & McClure No. 1 Kelley, NW SE SW sec. 22-26-14w. Drig. 765 ft.

Kilby et al No. 1 Skellenger, NE SE sec. 25-23-14. Drig. 1,625 ft.

Ward McGinnis No. 1 State Bank, NW NE NE sec. 14-28-15. S.D. 1,150 ft.

OKLAHOMA

Week Ending May 21

NORTHERN OKLAHOMA

Adair County

Maddon-Penn Mutual Life Ins. Co., C S½ NE NW sec. 5-16-24. T.D. 520 ft.; S.D.

Beckham County

Mid-American Oil Co. No. 1-A Biscoe, SW cor. sec. 28-8-22w. T.D. 2,764 ft.; S.D.

Cleveland County

W. A. Delaney et al No. 1 Bugher, SE SE SW sec. 12-7-2w. T.D. 7,682 ft.; flwd. 50 B.F.P.H., est. 20% S.W.; S.I.

Cimarron County

Barnsdall Oil Co. No. 1 School Ld., C NW SE sec. 35-5-5ecm. Drig. 3,640 ft.

Comanche County

Clyde Roach No. 1-A Green, SE SE SW sec. 2-1n-13w. T.D. 670 ft.; S.D.

Creek County

L. B. Jackson No. 1 Berryhill, NW NW NW sec. 1-18-10. Drig. 925 ft.

M. W. Muster et al No. 1 Holcomb, SE SW NW sec. 19-18-8. T.D. 3,018 ft.; 2,000 ft. W.I.H. and S.S.O.; S.D.

Garfield County

J. E. Kendall et al No. 1-A State, SW cor. sec. 13-23-3w. Spd.

Garvin County

First Natl. Oil Co. No. 1 Butterly, NE NE SE sec. 22-1n-1e. T.D. 100 ft.; R. U.R.

Grady County

Gulf Oil Corp. No. 1 Thomas, SW NW NW sec. 14-4-5w. T.D. 11,415 ft.; pipe stuck.

Greer County

J. H. Everitt No. 1 Graumann, NE NW NW sec. 11-5-21w. T.D. 550 ft.; S.D.

Hughes County

Homer Doup et al No. 1 Bank, NE NE NW sec. 7-7-9. S.D. 1,050 ft.

Phillaine Oil Co. No. 1 Morrison, SE SE SW sec. 13-9-10. T.D. 4,041 ft.; flwd. 22 B.O. in 36 hrs.; drlg. ahead.

Phillips Pet. Co. No. 1 Becker, NE NW SW sec. 8-5-10. T.D. 6,286 ft.; plug. 5,612 ft.; drld. out to 5,660 ft.; flwd. 202 B.O. in 24 hrs.; cutting 25%.

Troup & Strickland No. 1 Brown, NW SW NE sec. 32-6-8. S.D. 660 ft.

Kay County

Helmerich & Payne No. 1 Sch. Ld., SW SE SW sec. 16-28-1w. Drig. 150 ft.

Clark C. Nye No. 1 Willin, SE SE SW sec. 24-27-4. T.D. 1,466 ft.; S.D.R.

E. J. Shaffer et al No. 1 McKee, NE NW sec. 20-28-1w. T.D. 2,500 ft.; S.D.

Kiowa County

Anderson-Prichard Oil Corp. No. 1 Cribbs, sec. 28-7n-19w. Drig. 1,105 ft.

Anderson-Prichard Oil Corp. No. 1 Johnson, sec. 10-7-20w. T.D. 1,200 ft.; S.D.

Gaunt & Baker No. 1 Parks, NW NW SW sec. 29-7-20w. S.D. 720 ft.; mach. moved out.

Hughes & Reese No. 1 Fultz, SE SE SE sec. 10-6-18w. T.D. 1,238 ft.; S.D.

Lincoln County

Wilcox O. & G. Co. No. 1 Royer, SE SE NE sec. 18-14-6. T.D. 3,372 ft.; P.B. 3,240 ft.; waiting.

Logan County

Carter Oil Co. No. 1 Lydick, C E½ NW NE sec. 23-15-4w. T.D. 6,776 ft.; D.&A.

Sinclair-Prairie No. 1, Crews, SW SW NE sec. 27-16-1e. T.D. 5,215 ft.; to take D.S.T.

Muskogee County

T. P. Ciants No. 1 Jennings, NW NW NE sec. 8-13n-19. S.D. 810 ft.

Heydrick No. 1 Paschall, NE SE NW sec. 22-13n-19. S.D. 678 ft.

O. K. Jackson No. 1-A Smith, SW NE NE sec. 23-16-15. S.D. 520 ft.

Murray County

Gilbreath & Dutton No. 1 Wolfe, C SE SW sec. 8-1-2. T.D. 2,522 ft.; W.O.C.

Okfuskee County

Burke-Greis Oil Co. No. 1 Capps, SE cor. sec. 7-13-7. T.D. 3,227 ft.; shot 2,818-48 ft.; 2,874 ft.; S.D. to D.D.

W. R. Ramsey et al No. 1 Parks, SE SE SE sec. 4-12n-7. Drig. 3,974 ft.

Osage County

Chevalier-Simon No. 1 Osage, NW NW SW sec. 33-27-5. S.D. 2,385 ft.

I.T.I.O. Co. No. 1 Osage, SW SW NW sec. 7-24n-7. Drig. sh. 2,110 ft.

Norbia Oil Co. No. 1 Osage, SE cor. sec. 18-25-7. T.D. 2,784 ft.

Wah Sha She Oil Co. No. 1 Osage, NE NE NW sec. 4-28n-9. T.D. 1,503 ft.; U.R. 8-in.

Pawnee County

Darby No. 1-A Lillie, NW NW SW sec. 1-22-3. Wilcox 4,136 ft.; T.D. 4,148 ft. D.&A.

O. O. Owens et al No. 1 Riddle, C E½ E½ NW sec. 30-22-7. Drig. 1,985 ft.

Payne County

R. L. Kemp et al No. 1 Rafferty, SE SE NE sec. 6-18-5. T.D. 3,666 ft.; swbd. 55 B.O. and dry at 3,680 ft.; est. 20 B.O.P.D.; drlg. 3,697 ft.

Texas Co. No. 1 Logan, C W½ NW NW sec. 12-17-1e. T.D. 5,006 ft.; cmt. back to 4,974 ft.; drld. out to 4,956 ft.; F.O. and fresh wtr.; S.I. for tank and O.& G. separator.

Pittsburg County

Supreme Oil Corp. No. 1 Hickey, NW SW NW sec. 4-2n-15. S.D. 643 ft.

Supreme Oil Co. No. 1 Stevenson, SW SW SE sec. 27-3n-14. Drig. 75 ft.

Pontotoc County

Caloma Oil Corp. No. 1 Brents, SE NE SW sec. 4-1n-6. T.D. 1,574 ft.; S.D.; lost circ.

Cowley et al No. 1 McCormick, NW SW SW SE sec. 27-2n-4e. T.D. 402 ft.; abd.

Farmers Mutual Royalty Corp. No. 1 Waite, NE NE NW sec. 9-5-5. T.D. 2,727 ft.; D.S.T.

Loss Henry No. 1 Parker, SW SW SE sec. 17-4n-8. Drig. 555 ft.

H. W. Lee No. 1 Weatherby, NW SE NW sec. 24-1n-7. S.D. 700 ft.

Jack Lynch et al No. 1-A Parker, SW SW SE sec. 17-4-8. T.D. 4,200 ft.; S.D.R.

Union Dev. Co. No. 1 Abbott, SW NW NE sec. 34-3-6. T.D. 3,320 ft.; D.&A.

Union Dev. Co. No. 1-A Abbott, SW NW NE sec. 34-3-6. Drig. 150 ft.

Pottawatomie County

Pure Oil Co. No. 1 Lack et al, SE SW NW sec. 3-6-5. Drig. 3,687 ft.

Shell Pet. Corp. No. 1 Boley, SE SE SW sec. 5-11-6. T.D. 4,748 ft.; to run Schlumberger.

Seminole County

W. A. Delaney et al No. 1 Swan, SE SW SW sec. 18-6-6. Shot at 2,675 ft.; flwd. 101 B.O. in 24 hrs. while swdg. pipe.

Denver P. & P. No. 1 Mathis, SW NW SW sec. 7-6-6. Drig. 2,136 ft.

W. B. Pine No. 1 Wright, SE SE NE sec. 16-6-6. Drig. plug to 3,566 ft.; shot and swb. 22 B.O. in 3 hrs.

Smith & Greer No. 1 Coker, NW NE NE sec. 25-7-5. T.D. 3,014 ft.; swb. 25 B. O. and 25 B.W. in 24 hrs.; P.O.P.

Villines et al No. 1 Reed, NE NE NE sec 35-7n-5. T.D. 3,005 ft.; P.B. 2,999 ft.; swb. 25 B.O. in 24 hrs.; to shoot.

Wood Oil Co. No. 1 Cully, SW SW NW sec. 34-7-5. Drig. 2,580 ft.

Washita County

L. B. McWhirter No. 1 fee, NW SW SW sec. 34-8-19w. T.D. 2,147 ft.; fsg.

SOUTHERN OKLAHOMA

Atoka County

Amerada Pet. Corp. and Stanolind O. & G. Co. No. 1 Ridgway, NE cor. sec. 24-3s-9. P.B. 3,325 ft.; drld. to 3,420 ft.; bailing 1 B.O. and 1 gal. oil P.H.; D.&A.

C. M. Sheldon and Gardner Pet. Co. No. 1 Lee, NE NW SW sec. 2-4s-10e. T.D. 3,110 ft.; S.D.O.

Carter County

Texas Co. No. 1-B Cathey, SE NE NE sec. 6-5s-1w. T.D. 5,685 ft.; P.B. 5,477 ft.; hole swb. dry; S.D.O.

Choctaw County

Dr. Hardy et al No. 1 fee, SE SE NW sec. 21-7s-15. Drig. 310 ft.

Clyde Ross et al No. 1 Hardy, SE SE NW sec. 21-7s-15. Drig. 590 ft.

Cotton County

Jim Turner et al No. 3 Collins, SE SE NE sec. 18-4s-10w. Loc.

Creek County

L. B. Jackson No. 1 Berryhill, NW NW NW sec. 1-18n-10. Drig. 250 ft.

Jefferson County

J. Roy Stebbins et al No. 1 Bourland, SW SW SE sec. 24-7s-4w. Drig. sh. 3,113 ft.

Love County

Sinclair Prairie Oil Co. No. 1 Peabody, NE cor. sec. 35-6s-2w. T.D. 5,961 ft.; drill pipe stuck.

Marshall County

E. W. Hughes Drig. Co. et al No. 1 Vititoe, C NE SE sec. 11-5s-4e. Drig. 6,825 ft.

Stephens County

Coline Oil Co. No. 1 Johnson, C SW SE SE NE sec. 1-2n-8w. T.D. 10,000 ft.; 9,050 ft.; made several hd. flws., 37-grav. oil. S.I.O.

B. F. Lundy et al No. 1 Oxford, NE NE SW sec. 26-1s-4w. T.D. 4,203 ft.; S.D.

Tillman County

J. Ben Russell and Ray No. 1 Hasting, NW NE NW sec. 4-1s-19w. O.W.D.D.; old T.D. 2,754 ft.; drlg. 3,054 ft.

Smith No. 2 Hammell, NE NW NW sec. 6-5s-15w. T.D. 2,000 ft.; S.D.

ARKANSAS

Bradley County

Phillips Pet. Co. No. 1 Marsden, sec. 9-16w-11s. D.S.T. 5,080-97 ft.; mud and S.W.; drld. to 5,140 ft. and abd.

Columbia County

Standard Oil Co. of La. No. 2 Crone, NW cor. SE SW sec. 8-16-22. Top anhy. 7,115 ft.; top L. 7,224 ft.; set 7-in. csg. 7,218 ft.; comp.; 86 B.P.H. for 3 hrs.; open tbg.; I.P. 8 B.P.H.; ⅛-in. ck.; T. P. 680 lbs.; C.P. 470 lbs.; T.D. L. 7,269 ft.

Standard Oil Co. of La. No. 1 W. P. Phillips et al, 660 ft. N and W. C sec. 15-17-19. D.S.T. 7,351-95 ft.; ¼-in. ck.; 3 min.; W.P. 45 lbs.; closed tool and reseated; open 2 min. at 75 lbs. when bypass valve cut out; rec. 1,000 ft. gas-cut mud; cd. soft ool. L.; gas and dist. odor 7,419 ft.; rmd. core hole; did not set csg.; cg. hd. L. 7,566 ft.

Hempstead County

H. D. Easton et al No. 1 LaGrone, sec. 5-12-26. S.D. 3,100 ft.; W.O.

Shepherd & Todd et al No. 1 Smith, 450 ft. S line, 990 ft. E line, NW SW SE sec. 11-11-25. D.&A. 2,290 ft.

Lafayette County

Standard Oil Co. of La. No. 2 McKean, 660 ft. SW cor. SW SE sec. 7-16s-22w. Drig. 2,056 ft.

Little River County

Joe G. Strahan et al No. 2 Dierks Lbr. Co. Top L. 2,425 ft.; S.D. 2,497 ft.

Lonoke County

J. F. Russell No. 1 Gunter, sec. 17-5n-10w. Drig. 820 ft.

Miller County—Rodessa

F. W. Burford No. 1 Mitchell, sec. 11-20-28. Drig. L. 5,689 ft.

F. W. Burford No. 2-B Thomas, sec. 12-20-28. Set 5½-in. csg. 6,123 ft.; perf. 6,062-6,115 ft.; tstg. 6,125 ft.

J. L. Caracas No. 1 Mitchell, SW cor. NW NW sec. 11-20-28. Comp.; 20 B.P. H.; ⅜-in. ck.; C.P. 750 lbs.; set 5⅛-in. csg. 6,149 ft.; T.D. 6,180 ft.; perf. 6,144-49 ft.

F. F. Earles No. 1 General American Life Ins. Co., sec. 20-14-26. S.D. 1,232 ft.

Gerhig Co. of Ark. No. 2-B Mitchell, sec. 11-20-28. Comp.; 19 B.P.H.; ½-in. ck.; T.P. 300 lbs.; C.P. 500 lbs.; set 5⅛-in. csg. 6,152 ft.; perf. 6,120-50 ft.; T.D. 6,157 ft.

Sam Killingsworth No. 1 Greer, sec. 11-20-28. Drig. L. 4,915 ft.

Kroll & Travis No. 2 Dickinson, 330 ft. NW cor. SE NW sec. 11-20-28. Drig. 2,000 ft.

John Kraker No. 1-C Mitchell, sec. 10-20-28. Set 5-in. csg. 6,188 ft.; T.D. 6,190 ft.

B. B. Orr No. 2 Mitchell, sec. 10-20-28 Comp.; 22 B.P.H.; ½-in. ck.; C.P. 475 lbs.; set 5⅛-in. csg. 6,169 ft.; perf. 6,127-34 ft.; T.D. 6,172 ft.

Red Iron Drlg. Co. No. 1 Mitchell, sec. 2-20-28. Drig. sh.&L. 3,558 ft.

Texarkana Drlg. Co. No. 1 Capps, sec. 10-20-28. Drig. sh.&L. 5,007 ft.

Texas Canadian Oil Corp. No. 2 Thomas, NE cor. NW SE sec. 12-20-28. Reperf. 6,108-16 ft., 6,125-32 ft., and 6,146-53 ft.; swbd. approx. 25 bbls. oil; treated with 3,000 gal.; T.D. 6,156 ft.; S.D. 5,007 ft.

Nevada County

B. L. Webb No. 1 Boswell, sec. 5-14-20. Set 10-in. csg. 63 ft.

Bruce E. Wallace No. 2 Haynie, SE cor. SE NE sec. 5-14-21. Sdy. sh. 1,194-1,204 ft.; tstd. mud, S.W. and oil 1,198-1,214 ft.; 30 min.: W.O.; T.D. 1,214 ft. set 6-in. csg. 1,198 ft.; swbd. est. 10 bbls. oil; W.O.

Pike County

Bruce E. Wallace No. 1 Tilyeu, sec. 26-8s-24w. S.D. 330 ft.

Pulaski County

Coker Oil Corp. No. 1 Stone, sec. 36-3n-11w. Set 12½-in. csg. 108 ft.

A. L. Kitselman, No. 2 A. L. Kitselman Jr., SE SE SW sec. 2-1s-13e. Drig. hd. blk. sh. 2,900 ft.

Union County—Schuler

Alice Sydney Oil Co. No. 2 Powledge, sec. 7-18-17. Jones sd. 7,610-50 ft.; set 7-in. csg. 7,692 ft.; T.D. 7,700 ft.

Alice Sydney Oil Co. No. 3 Powledge, SW cor. SE SE sec. 7-18-17. Jones sd. 7,608-43 ft.; 7-in. csg. 7,689 ft.; T.D. 7,700 ft.

E. M. Jones et al No. 2-A Murphy, sec. 19-18-17. Jones sd. 7,528-78 ft.; 7-in. csg. at 7,599 ft.; T.D. 7,610 ft.

E. M. Jones No. 1 Rogers, SW SW sec. 16-18-17. Drig. sdy. sh. 3,282 ft.

Lion Oil Ref. Co. No. 1 Marcus, sec. 18-18-17. Drig. rd. sdy. sh. 7,151 ft.

Lion Oil Ref. Co. No. 3 Marine Oil Co., sec. 17-18-17. Top Jones sd. 7,516 ft.; set 7-in. csg. 7,614 ft.; T.D. 7,622 ft.; perf. 7,533-53 ft.; comp.; 35 B.P.H.; ¼-in. ck.; T.P. 1,275 lbs.; C.P. 1,975 lbs.

Lion Oil Ref. Co. No. 2 Mayfield, Lot 2, sec. 18-18-17. Drig. rd. sdy. sh. 7,086 ft.

Lion Oil Ref. Co. No. 3 Mayfield, sec. 18-18-17. Drig. rd. and gr. sh. 5,843 ft.

Lion Oil Ref. Co. No. 4 Mayfield, C Lot 3, NW sec. 18-18-17. R.U.

Lion Oil Ref. Co. No. 1 Edna Morgan, NE cor. Lot 5, NW sec. 18-18-17. Jones sd. 7,569-7,630 ft.; 7-in. csg. 7,670 ft.; T.D. 7,682 ft.

Lion Oil Ref. Co. No. 2 Edna Morgan, sec. 18-18-17. Jones sd. 7,569-7,624 ft.; ran 7-in. csg. 7,665 ft.

Lion Oil Ref. Co. No. 6-B Edna Morgan, sec. 18-18-17. Set 10¾-in. csg. 2,285 ft.

Lion Oil Ref. Co. No. 1 Nelson, sec. 18-18-17. Drig. rd. and gr. sh. 5,054 ft.

Marine Oil Co. No. 5 fee, sec. 17-18-17. Drig. rd. sdy. sh. 7,502 ft.

Marine Oil Co. No. 6 fee, sec. 17-18-17. Drig. rd. sdy. sh. 7,452 ft.

Phillips Pet. Co. No. 3 Justiss, Lot 6, sec. 18-18-17. Top Jones sd. 7,506 ft.; top L. 7,609 ft.; cd. 60 ft. sat. L. in Reynolds L.; cg. hd. dense L. 8,157 ft.

Phillips Pet. Co., No. 3 Marine Oil Co., sec. 20-18-17. Jones sd. 7,515-66 ft.; 7-in. csg. 7,630 ft.; T.D. 7,650 ft.

Phillips Pet. Co. No. 4 Marine Oil Co., sec. 20-18-17. Top Jones sd. 7,516 ft.; top oolitic L. 7,605 ft.; T.D. 7,640 ft. set 7-in. csg. 7,629 ft.; perf. csg.

Phillips Pet. Co. No. 5 Marine Oil Co., sec. 20-18-12. Drig. rd. sdy. sh. 7,422 ft.

Phillips Pet. Co. No. 3 Marks, C Lot 2, Drig. rd. and gr. sh. 6,148 ft.

Union County—Other

Ark. Southern Oil Corp. No. 3-A Simmons, sec. 15-18-13. Set 10-in. csg. 162 ft.

J. R. Lockhart No. 1 Raulston, sec. 12-17-14. R.U.: W.O.

Joe Modisette et al No. 1 Union Sawmill Co., sec. 8-18-12. R.U.

W. D. Wingfield, Tr. No. 2 Kidd Est., SE cor. NW SW sec. 15-18-13. Sd. S.D. 2,257-2,300 ft.; set 6-in. csg. 2,250 ft.; T.D. 2,360 ft.; W.O.S.R.

LOUISIANA

N. LOUISIANA WILDCATS

Bienville County

Gulf Ref. Co. No. 1 Goodpine, sec. 25-14-8. Drig. dk. gr. sh. strks. L. 9,943 ft.

Producers O. & G. Co. No. 1 Locke, NE cor. sec. 9-15-10. O.W.W.O.; old T.D. 2,960 ft.; rmd. to 800 ft.; S.G.; hole cleaned out; sat. L. 2,952-53 ft.; set 8⅝-in. csg. 2,947 gt.; tested dry; M.I. heavy rigs; T.D. 3,005 ft.

Bossier Parish

Premier Inv. Co. No. 1 McDade, SE SW NE sec. 28-19-11. S.D. 2,264 ft.

Sloan, Lloyd et al No. 1 Sherrill, sec. 12-19-12. T.D. 780 ft.; set 5½-in. 778 ft.; perf. and tstg.

Triangle Drlg. Co. No. 4-A Skannel, NE SW sec. 13-17-12. Set 5½-in. csg. 3,009 ft.; T.D. 3,140 ft.; no ga.; S.I.; W.O. stg.

Triangle Drlg. Co. No. 4 Thigpen-Herold, 665 ft. S line, 667 ft. W line, NE SE sec. 13-17-12. Drlg. 1,170 ft.

Union Prod. Co. No. 3-C Skannel, NE cor. sec. 13-17-12. Drig. 2,054 ft.

Union Prod. Co. No. 2 Thigpen-Herold, sec. 13-17-12, T.D. 3,162 ft.; D.S.T. 2,980-3,030 ft.; rec. 400 ft. oil and 120 ft. mud and oil in 21 min.; set 7-in. csg. 3,109 ft.; P.B. 3,132 ft.; treated 2,000 gal. acd.; no ga.; S.I.; W.O. stg.

Caddo Parish

Carroll et al No. 1 Hart, NW sec. 26-21-16. R.U.

L. I. Davis No. 4 Stiles, sec. 7-20-15. Drig. sh. 750 ft.

J. P. Driscoll No. 2 Sattelite, sec. 10-20-15. Set 6-in. csg. 2,175 ft.; T.D. 2,189 ft.; comp.; flwg. 100 B.P.B.

W. D. Flynn No. 4 Natalie, SE cor. sec.

10-21-16. Set 7-in. at 998 ft.; W.O.; T.D. 1,027 ft.

J. T. Humphrey No. 1 Caddo Levy Bd., sec. 26-21-16. Comp.; est. 7 B.P.H. and 3,000,000 ft. gas; open tbg.; T.D. 2,270 ft.

Midfield Oil Co. No. 1 Muslow, C sec. 6-20-15. Set 6⅝-in. csg. at 1,350 ft.

Petroleum Heat & Power Co. No. 1 Wemple, NW cor. sec. 14-20-15. Set 6-in. csg. 2,185 ft.; S.D. 2,605 ft.

G. R. Stevens No. 3 Hart, sec. 22-21-16. Set 6-in. csg. 997 ft.; comp.; pmp. 50 B.P.D.; T.D. 1,003 ft.

Triple M Oil Co. No. 1 Boisseau, sec. 34-21-16. S.D.; W.O. 1,888 ft.

G. H. Vaughn No. 1 Stiles, sec. 21-21-16. S.D.; W.O. 1,024 ft.

Caldwell Parish

E. T. Oakes et al No. 1 Kyles, sec. 18-11-3e. Set 12-in. csg. 467 ft.; S.D.

Catahoula Parish

G. C. Foster et al No. 1 Peck, sec. 38-10-8e. Cg. 645 ft.

Claiborne Parish

Atlantic Ref. Co. No. 1-C Bean, sec. 32-21-4. Comp.; 49 B.P.H.; ¾-in. ck.; T.P. 200 lbs.; C.P. 225 lbs.; 5½-in. csg. 5,207 ft.; T.D. 5,227 ft.

Harry Fetiades No. 3 King, sec. 11-20-5. Comp.; 132 B.P.D.; 11/64-in. ck.; T.P. 100 lbs.; set on pkr.; 5½-in. csg. 5,263 ft.; T.D. 5,278 ft.

Harry Fetiades No. 4 King, sec. 10-20-5. Comp.; 495 B.P.D.; 11/64-in. ck.; T.P. 275 lbs.; tbg. set on pkr.; 5½-in. csg. 5,348 ft.; T.D. 5,370 ft.

Harry Fetiades No. 1 Whitman, C NE NW sec. 2-20-5. Set 10¾-in. csg. 745 ft.

Gulf Oil Corp. No. 3 Patton, sec. 11-20-5. Comp.; 1,066 B.P.D.; open tbg.; T.P. 200 lbs.; 5½-in. csg. 5,238 ft.; T.D. 5,252 ft.

Love Pet. Co. No. 1 English, sec. 29-21-4. Set 5½-in. csg. 5,109 ft.; T.D. 5,132 ft.

Magnolia Pet. Co. No. 2 Lloyd, sec. 2-20-5. Drlg. sh.&L. 4,000 ft.

Morelock & Bevil No. 1 Kilgore, sec. 12-20-5. Sat. L. 5,332-38 ft. and 5,342-46 ft.; set 5½-in. csg. 5,330 ft.; T.D. 5,346 ft.

W. H. North et al No. 1 Patton, sec. 12-20-5. Drlg. sh.&L. 5,145 ft.

Oakes et al No. 1 Kilgore, NE cor. SE sec. 28-21-15. D.S.T. 4,188-4,225 ft.; tstd. dry in 5 min.; cg. sh.&L. 4,892 ft.

Scouts Oil Corp No. 1 Fowler, sec. 28-21-4. Comp.; 50 B.P.H.; ¾-in. ck.; T.P. 230 lbs.; C.P. 250 lbs.; 5½-in. at 5,242 ft.; T.D. 5,260 ft.

Sells Pet. Co. No. 1-A Patton, sec. 11-20-5. Set 5½-in. csg. 5,318 ft.; comp.; 25 B.P.H.; ¾-in. ck.; T.P. 300 lbs.; T.D. 5,340 ft.

Skelly Oil Co. No. 1 Enlee, sec. 28-21-4. Drlg. anhy.&sh. 4,050 ft.

Sklar Oil Corp. No. 1 Kilgore, sec. 11-20-5. Sat. L. 5,281-86 ft.; comp.; 53 B. P.H.; ¾-in. ck.; 5½-in. csg. 5,280 ft.; T.D. 5,306 ft.

Sloan & Zook No. 7 Patton, sec. 1-20-5. Set 5½-in. csg. 5,311 ft.

Texas Canadian Oil Co. No. 1 Fowler, sec. 32-21-4. Drlg. sh.&L. 4,720 ft.

Texas Co. No. 1 Tippett, sec. 33-21-4. Sat. L. 5,303-10 ft.; set 5-in. csg. 5,293 ft.; tstg. 5,318 ft.; S.D.; will not flow.

W. A. Thorpe No. 1 Fowler, sec. 33-21-4. Comp.; 60 B.P.H.; ½-in. ck.; T.P. 250 lbs.; 5½-in. csg. 5,275 ft.; T.D. 5,293 ft.

Union Prod. Co. No. 2 Brownfield, sec. 5-19-5. T.D. 10,759 ft.; hole off 5 deg. P.B. 10,561 ft.; rmg. 10,661 ft.

Union Prod. Co. No. 1 Coleman, sec. 43-7-9e. T.D. 5,847 ft.; arng. run csg.

Weaver Oil Corp. No. 2 Edmonds, sec. 16-20-5. Drlg. L. 5,704 ft.

Weaver-Perry Oil Co. No. 1 Patton Est., sec. 11-20-5. Drlg. L.&sh. 4,715 ft.

Concordia Parish

Morrison & Co. No. 1 Winston, sec. 43-7-9e. Drlg. sh. 1,210 ft.

De Soto Parish

S. S. Alexander No. 1 Stoll, NE cor. sec. 5-12-16. O.W.W.O.; old T.D. 6,002 ft.; set short string 5½-in. csg. 5,479 ft reperf. 5,420-40 ft.; tstg. S.W. 5,440 ft. and recmtd. perf.

Hunter Co. No. 1 Parker, sec. 26-12-16. Set 9⅝-in. csg. 1,380 ft.; well blew out at 2,912 ft.; drlg. L.&anhy. 4,757 ft.

La. Seaboard Oil Ref. Co. No. 1 Lawrence, sec. 36-12-14. Set 8¼-in. csg. 2,031 ft.; tstd. dry; cg. 2,826 ft.

Pet. Heat & Power Co. No. 1-B Kavanaugh, sec. 12-11-12. Rmg. 2,800 ft.

Pet. Heat & Power Co. No. 1 Matthews, sec. 29-12-11. Tstd. dry 3,950 ft.; P.B. 2,400 ft.; to test old T.D. 4,003 ft.

Pet. Heat & Power Co. No. 1 Rives, sec. 20-12-11. Drlg. sh. 3,100 ft.

Pet. Heat & Power No. 1 Williams, W. R., NW NE sec. 13-11-12. (Cor.); D.S. T. 2,800-18 ft.; S.G.; 7-in. csg. set 2,800 ft.; tstg. 2,827 ft.; W.O.; T.D. 2,827 ft.; tstd. S.G.; arng. test 2,827 ft.

Texas Co. No. 2 White, SW NE sec. 24-12-12. Set 4½-in. csg. 835 ft.; S.D. 890 ft.

Texas Co. No. 1 Thigpen, sec. 29-12-11. Comp.; 10,000,000 ft. gas; T.&C.P. 330 lbs.; perf. 2,632-38 ft.; T.D. 2,826 ft.

Franklin Parish

Southern Star Pet. Co. No. 3 Grayson, sec. 36-12-6e. S.D. 1,900 ft.

Grant Parish

R. D. Bevil et al No. 3 Holmes, SW SW sec. 17-9-1e. Set 10-in. csg. 62 ft.; drlg. sh. 535 ft.

A. M. Pet. Co. No. 1 Holmes, sec. 20-9-1e. S.D. 850 ft.

C. L. Thompson No. 1 McNeely Est., NE cor. sec. 10-6-3w. Drlg. sh. 2,620 ft.

La Salle Parish

Alexander & Jarvis No. 1 Tremont, sec. 2-9-1e. Set 6-in. csg. 1,490 ft.; T.D. 1,493 ft.; comp.; 75 B.P.D.; pmpg.

Cupples et al No. 1 King, sec. 25-10-1e. Set 5⅛-in. csg. 1,540 ft.; S.D. 1,549 ft.

Pet. Heat & Power Co. No. 1 Biggs-Cockerham, NW cor. SE SE sec. 26-10-1e. Cg. 1,528 ft.

Natchitoches Parish

Roy Raines et al No. 1 Prudential Life Ins. Co., sec. 22-10-9w. Set 12-in. csg. 70 ft.; T.D. 1,250 ft.; fsg.

W. P. Ryan et al No. 1 Lambert, sec. 4-8-9. S.D.; W.O. 3,001 ft.

Red River Parish

Glassell & Whitehurst No. 1 LeLong, NE NW NE sec. 25-12-11. S.D. 2,874 ft.

R. M. Hutchins No. 1 Sample, sec. 11-14-11. Set 7-in. csg. 1,225 ft.

Monte Oil Co. No. 1 McClelland, NW NW sec. 24-13-11. Arng. D.S.T. 974 ft.

Sabine Parish

Hare et al No. 1 Stoby, SW cor. SE sec. 10-8-12. R.U.

W. L. McClanahan No. 1 Frost Lbr. Co., sec. 22-9-13. R.U.

Major Oil Co. No. 2 Henry, sec. 12-7-13. Set 7-in. csg. 2,134 ft.; treated with 3,000 gal. acd.; tstg.; comp.; pmpg. 144 B.P.D.; T.D. 2,444 ft.

F. W. Martin Drlg. Co. No. 1 Sabine Lbr. Co., C W½ NE NE sec. 26-7-14. M.I.M.

H. N. Morris No. 1 Irving & Bishop, C NW NW sec. 18-7-12. Recmtd. 6-in. csg.; T.D. 2,495 ft.; W.O.S.R.

Plymouth Oil Corp. No. 1 Kezerle, sec. 3-7-13. Tstd. S.W. 2,494 ft.; S.D.

W. L. Posey No. 1-A Ramirez, sec. 12-7-13. Will set csg. 2,147 ft.

Albert Reich No. 1 Glaque, 330 ft. NE cor. SE NE sec. 27-7-14. R.U.

Republic Gas Co. No. 1 Whitney Corp., sec. 8-9-13. S.D. hd. sh.&strks. L. 8,929 ft.

Royal O. & G. Co. No. 3-A Frost Lbr. Co., C NE SE sec. 19-9-13. Set 7-in. csg. 1,540 ft.; T.D. 1,961 ft.; W.O.S.R.

Sutton-Zwolle Oil Co. No. 1 Sabine Lbr. Co., SE cor. NW NE sec. 23-7n-14w. Blew in while cg.; installed blowout preventer; plugged off D.S.; flwg. 41 B.P.H.; ⅝-in. ck.; D.S. press. 1,050 lbs.; T.D. 4,208 ft.

J. J. Watson No. 1 Sabine, sec. 12-7-13. Set 6-in. csg. 2,145 ft.; T.D. 2,222 ft.; acdz.; dry; will deepen.

Lee Whitehurst No. 6 Frost Lbr. Co., sec. 29-9-13. Set 6⅝-in. csg. 1,589 ft.; treated with 2,000 gal. acd.; W.O.S.R.

Tensas Parish

H. V. Schumacker No. 4 Mount Plantation, sec. 39-11-12e. S.D. 1,775 ft.

Union Parish

Standard Oil Co. of La. No. 1 Frost Lbr., sec. 14-21-1e. Cg. hd. gr. sd. 9,577 ft.

Webster Parish

S. W. L. Backus No. 4 Pardee, sec. 3-22-11. S.D. 1,935 ft.

Fohs Oil Co. No. 1 Crichton, sec. 33-21-10. Drlg. sdy. sh. 7,192 ft.

Hunt Oil Co. No. 6 Babb, C NE SW sec. 14-21-10. Drlg. sdy. sh. 7,682 ft.

Hunt Oil Co. No. 7 Babb, C NW SE sec. 14-21-10. Poor Holloway sd. 5,557-61 ft. and 5,582-86 ft.; set 9⅝-in. csg. 5,750 ft.; tstg. 6,155 ft.

Hunt Oil Co. No. 9 Davis, sec. 14-21-10. Drlg. sh.&L. 4,877 ft.

Hunt Oil Co. and Ray Drlg. Co. No. 2 Bodcaw, C NW NE sec. 33-21-10. R.U

Hunt Oil Co. No. 3 Webb, C NW SW sec. 13-21-10. Drlg. sd.&sh. 5,960 ft.

Magnolia Pet. Co. No. 1 Crichton Unit, sec. 33-21-10. Drlg. sh.&L. 4,329 ft.

Magnolia Pet. Co. No. 3 Crichton, 795 ft. N line, 763 ft. W line, sec. 33-21-10. R.U.

Magnolia Pet. Co. and Ray Drlg. Co. No. 1 Stewart-Crichton, sec. 33-21-10. Drlg. sh.&L. 4,830 ft.

Magnolia Pet. Co. No. 1 Robbins Unit, sec. 21-21-10. Drlg. sh.&L. 4,965 ft.

Magnolia Pet. Co. No. 1 Sexton Unit, NW SE sec. 32-23-9. Cd. Bodcaw sd.; no show; cd. sd. 8,293-8,310 ft.; gas odor; slight show gas and dist.; cg. hd. sdy. L. 8,599 ft.; ran Schlumberger 8,521 ft.; cd. sd. 8,899-8,906 ft.; gas odor; sd. at 9,007 ft.; dist. odor; cg. hd. sd.&sh. 10,251 ft.

Midstates Oil Corp. No. 1 Welorl Lbr. Co., C NW NW sec. 3-20-10. Top Tr. Pk. 6,029 ft.; no Holloway sd.; set 9⅝-in. csg. 6,121 ft.; drlg. sdy. sh. 7,514 ft.

Morgan et al No. 1-A Hope, C NW NW sec. 25-21-10. Drlg. sdy. sh. 7,780 ft.

Ohio Oil Co. No. 3 Bodcaw, Acct. 4, sec. 28-21-10. Drlg. sh. 7,836 ft.

Ohio Oil Co. No. 50 Bodcaw. Acct. 3, sec. 34-21-10. Drlg. sdy. sh. 5,540 ft.

Ohio Oil Co. No. 4 Cox, Acct. 2, C SW sec. 15-21-10. Set 13⅜-in. csg. 803 ft.

Ohio Oil Co. No. 1 Gray, NW cor. SE NW sec. 28-21-10. Drlg. sd.&sh. 7,617 ft.

Ohio Oil Co. No. 24 Gray, NE cor. sec. 35-21-10. Drlg. hd. sd. 7,573 ft.

Ohio Oil Co. No. 1 A. H. Gray, Acct. 3, sec. 26-21-10. Drlg. L.&sh. 6,354 ft.

Ohio Oil Co. No. 1 Jackson, sec. 27-21-10. No Holloway sd.; set 9⅝-in. csg. 5,600 ft.; drlg. sdy. sh. 7,079 ft.

Ohio Oil Co. No. 1 Sandlin, sec. 27-21-10. No Holloway sd.; set 9⅝-in. csg. 5,574 ft.; drlg. hd. sd. 7,165 ft.

Ohio Oil Co. and Union Prod. Co. No. 1 Tillman-Gleason, sec. 28-21-10. Drlg. L.&sh. 4,170 ft.

Oliphant No. 3 Banks, sec. 34-21-10. Top Tr. Pk. 5,797 ft.; drlg. sh. 8,005 ft.

A. G. Oliphant No. 2 Hodges, C NW SE sec. 34-21-10. 9⅝-in. csg. 5,689 ft.; tstd. dry 5,859 ft.; drlg. sh. 6,331 ft.

A. G. Oliphant No. 1 Stewart, sec. 33-21-10. Holloway sd.; no show; drlg. sdy. sh. 8,448 ft.

Stanolind O. & G. Co. No. 1 Pardee Co., SW NE sec. 36-21-10. Cg. sh. 8,425 ft.

Union Prod. Co. No. 1 Josey, sec. 27-21-10. Rmg. 5,628 ft.

SOUTH LOUISIANA FIELDS

Abbeville—Vermilion Parish

Continental Oil Co. No. 1 Franciol, sec. 67-12s-3e. R.U.

Continental Oil Co. No. 1 Hebert, sec. 67-12s-3e. 10¾-in. csg. 1,510 ft.; T.D. 7,448 ft.; D.S. stk.; fsg.; P.B. 7,301 ft.; to sdtrk.; drlg. sh. 9,191 ft.

Continental Oil Co. No. 1 Motty, sec. 67-12s-3e. T.D. 8,242 ft.; P.B. 6,460 ft.; 7-in. csg. 6,460 ft.

Anse La Butte—St. Martin Parish

Butte Oil Co. No. 2 Billeaud, sec. 117-9s-5e. R.U.

Paul Fly et al No. 1 Moresi, sec. 118-9s-5e. Drlg. rk. 1,064 ft.

Baton Rouge—East Baton Rouge Parish

Wm. Helis No. 3 La. State, sec. 65-7s-1w. T.D. 7,350 ft.; P.B. 3,000 ft. to do directional drlg.

Bay St. Elaine—Terrebonne Parish

F. J. LeBlanc No. 2 Wurzlow, sec. 17-22s-18e. S.D. 816 ft.

Texas Co. No. 17 State, sec. 18-22s-18e. Drlg. wtr. sd. 5,511 ft.

Bayou Blue—Iberville Parish

Humble O. & R. Co. No. 6 Wilbert Sons Lbr. Co., sec. 66-9s-11e. 7-in. csg. 6,982 ft.; T.D. 7,006 ft.; made 28-min. D.S.T. 6,990-7,006 ft.; flwd. oil and wash wtr.; recvd. 2,600 ft. of 35-grav. oil; no S.W.

Bayou De Allemands—St. Charles Parish

Amerada Pet. Corp. No. 1 Gheens Realty Co., sec. 56-15s-20e. T.D. 7,010 ft.; P.B. 6,398 ft.; sdtrkd.; D.S. stk. at 6,502 ft.

Amerada Pet. Corp. No. 4 State, sec. 13-15s-20e. 13⅜-in. csg. 1,976 ft.; drlg. sdy. sh. 7,347 ft.

Amerada Pet. Corp. No. 2 St. Charles Ld. Co., sec. 13-15s-20e. Drlg.

Big Lake—Cameron Parish

Union Sulphur Co. No. 2 Miami Corp., sec. 19-12s-8w. T.D. 9,439 ft.; P.B. to 6,500 ft.; sdtrkd.; top oil sd. 6,775 ft.; recvd. S.W. on D.S.T.; abd.

Caillou Island—Terrebonne Parish

Texas Co. No. 29 State, sec. 17-23s-20e. Loc.

Cameron Meadows—Cameron

Burton-Sutton Oil Co. No. 23 School Ld., sec. 16-14s-13w. T.D. 5,786 ft.; 7-in. csg. 5,323 ft.; tstd. S.W.; P.B. to 2,950 ft.; trying to sdtrk.

Burton-Sutton Oil Co. No. 24 School Ld., sec. 16-14s-13w. Drk.

Burton-Sutton Oil Co. No. 25 School Ld., sec. 16-14s-13w. Drlg. sdy. sh. 4,144 ft.

Magnolia Pet. Co. No. 22 Cameron Meadows, sec. 21-14s-13w. T.D. 4,242 ft.; 9⅝-in. csg. 4,242 ft.; perf. csg. 4,221-30 ft.; flwg. P.L. oil; went dead: P.B. 4,232 ft.; perf. csg. 4,218-28 ft.; flwd. oil and S.W.

Cheneyville—Rapides Parish

Amerada Pet. Corp. No. 5 Well Ld. Co., sec. 53-1s-2e. Drlg. sh. 4,585 ft.

Texas Co. No. 3 Well Ld. Co., sec. 53-1s-2e. Drlg. sdy. sh. 6,533 ft.

Charenton—St. Mary Parish

Commerce Oil Co. No. 1 Dalnh Parro, sec. 31-13s-10e. Cd. oil sd. 6,658-95 ft.; T.D. 6,702 ft.; 9⅝-in. csg. 6,695 ft.; prep. to test.

Pan American Prod. Co. No. 5 Laws Realty Co., sec. 25-13s-9e. R.U.

Pan American Prod. Co. No. 6 Laws, sec. 25-13s-9e. Drk.

Pan American Prod. Co. No. 7 Veeder, sec. 25-13s-9e. T.D. 1,130 ft.; 7-in. csg. 1,124 ft.; I.P. 80 B.O.P.D.; jetting.

Choctaw—Iberville Parish

La. Crusader Oil Co. No. 2 Schwing, sec. 29-8s-11e. Cd. oil sd. 8,250-56 ft.; S.D. 8,258 ft.

Creole—Cameron Parish

Superior Oil Co.-Pure Oil Co. No. 2 State, Gulf of Mexico. R.U.

Darrow—Ascension Parish

Darrow Oil Co. No. 1 Dennis, sec. 68-10s-2e. T.D. 2,150 ft.; S.D.

Humble O. & R. Co. No. 17 Community, sec. 33-10s-2e. T.D. 6,584 ft.; perf. csg. 6,064 ft.; made sqz. job; drlg. out cmt. to 6,616 ft.; perf. csg. 6,587-97 ft.; made sqze. job; drld. out; perf. csg. 6,510-20 ft.; made sqze. job; perf. csg. 6,536-40 ft.; tstd. S.W.; abd.

Humble O. & R. Co. No. 18 Community, sec. 30-10s-2e. Abd.; drk.

Kiva Oil Co. No. 1 Duplessis, sec. 69-10s-2w. S.D. 2,523 ft.

Dog Lake—Terrebonne Parish

Texas Co. No. 21 State, sec. 5-22s-16e T.D. 7,174 ft.; P.B. 5,490 ft.; sdtrkd.; T.D. 6,882 ft.; 10¾-in. csg. parted; fsg.

Four Isle—Terrebonne Parish

Texas Co. No. 19 State-Lake, sec. 17-23s-18e. T.D. 6,315 ft.; D.S. stk.

Gibson—Terrebonne Parish

Shell Pet. Corp. No. 1 Kuntz, sec. 40-17s-15e. R.U.

Shell Pet. Corp. No. 6 Pellican, sec. 20-17s-15e. Bldg. drk.

Fausse Point—Iberia Parish

Texas Co. No. 4 State, sec. 35-11s-8e, 18⅝-in. csg. 90 ft.; top sd. 7,912 ft.; top salt 6,595 ft.; T.D. 9,246 ft.; 7⅝-in. csg. 9,236 ft.; T.D. 9,435 ft.; 5½-in. csg. 9,345 ft.; perf. csg. 9,251-61 ft.

Garden Island—Plaquemines Parish

Texas Co. No. 29 State, sec. 38-23s-33e. T.D. 584 ft.

Hackberry—Cameron Parish

W. T. Burton No. 1 Duhon, sec. 29-12s-10w. R.U.

W. T. Burton No. 1 F. Lacy, sec. 22-12s-10w. Drlg. sh. 2,510 ft.

W. T. Burton No. 3 Lewis, sec. 22-12s-10w. R.U.

John Merrick No. 1 R. Vincent, sec. 28-12s-10w. T.D. 3,354 ft.; abd.

Stanolind O. & G. Co. No. 8 Carter & Sweeney, sec. 22-12s-10w. R.U.

Stanolind O. & G. Co. No. 10 Carter & Sweeney, sec. 22-12s-10w. R.U.; (cor.).

Superior Oil Co. No. 1 Benson-Vincent, sec. 30-12s-10w. T.D. 6,913 ft.; P.B. 6,248 ft.; I.P. 12 bbls. dist. 10 hrs.; 12/64-in. ck.

Sutton Oil Co. No. 6 Duhon, sec. 22-12s-10w. T.D. 3,261 ft.; 7-in. csg. 3,245 ft. I.P. 361 bbls.; ¼-in. ck.

Texas Co. No. 24-B State, sec. 12s-9w T.D. 8,052 ft.; blew out; stk. D.S.; hole cleaned out to 7,659 ft.

Union Sulphur Co. No. 1 Doiron, sec. 37-12s-10w. 7-in. csg. 4,876 ft.; T.D. 5,940 ft.; S.T.; T.D. 5,023 ft.; P.B. 5,000 ft.; drlg. L. in sdtrkd. hole 5,443 ft.

Horseshoe Bayou—St. Mary Parish

Texas Co. No. 2 State, sec. 37-17s-9e. R.U.

Jeanerette—St. Mary Parish

Herton Oil Co. No. 1-A Roane Sugar Co., sec. 38-13s-9e. Drlg. sh. 9,516 ft.

Jennings—Acadia Parish

F. W. Bennett No. 2 Brethern, sec. 41-9s-2w. Drlg. L.&sh. 6,490 ft.

W. T. Burton No. 6 Roboria, sec. 41-9s-2w. Drlg. sd. 570 ft.

H. Fotiades No. 2 Washington Opelousas, sec. 41-9s-2w. 16-in. csg. 106 ft.; T.D. 6,659 ft.; 7-in. csg. 6,659 ft.; well blew out; cutting and pulling tbg.

Frio Oil Co. No. 1 Gulf fee, sec. 45-9s-2w. Drlg. sh.&L. 3,435 ft.

Frio Oil Co. No. 1 Iowa-Jennings, sec. 45-9s-2w. Drlg. sh.&shlls. 4,905 ft.

Lodak Oil Co. No. 5 J. C. Clement, sec. 46-9s-2w. Drlg. gbo. 1,500 ft.

T. G. Markley No. 1 Gulf Ld., sec. 45-9s-2w. Drlg. sh.&L. 6,018 ft.

W. S. Noble et al No. 1 Ed Prather, sec. 45-9s-2w. R.U.

Pet. Heat & Power Co. No. 1 Iowa-Jennings, sec. 45-9s-2w. T.D. 3,770 ft.; P. B. 1,055 ft.; to sdtrk.

Pet. Heat & Power Co. No. 1 Smith, sec. 45-9s-2w. S.D. 805 ft.

Stanolind O. & G. Co. No. 112 Crowley Oil & Mineral Co., sec. 48-9s-2w. R.U.

Stanolind O. & G. Co. No. 19 Houssiere Latrelle, sec. 47-9s-2w. T.D. 6,448 ft.; P.B. 6,135 ft. to strtn. hole; T.D. 6,979 ft.; P.B. 6,700 ft.; P.B. and sdtrkg. 7,509 ft.; T.D. 7,917 ft.; 7-in. csg. 7,917 ft.; drlg. sh.&L. 8,182 ft.

Superior Oil Co. No. 3 Jules Clement, sec. 46-9s-2w. Drlg. sh. 4,595 ft.

Superior Oil Co. No. 10 Leckelt, sec. 43-9s-2w. Drlg. sd. 4,762 ft.

Superior Oil Co. No. 13 Leckelt, sec. 42-9s-2w. Drlg. sh.&sd. 2,497 ft.

Superior Oil Co. No. 14 Leckelt, sec. 42-9s-2w. Drlg. sd.&L. 5,876 ft.

Victor Weisse No. 1 Clement, sec. 46-9-2w. T.D. 3,247 ft.; 6⅝-in. csg. 3,032 ft. blew out; R.U. christmastree to test. failed to flow; tstg.

Lafitte—Jefferson Parish

Carter-Perrin & Brian No. 1 Lucien, Adams, sec. 9-17s-24e. Loc.

Texas Co. No. 10 Lafitte, sec. 17-17s-24e. Drlg. wtr. sd. 10,186 ft.

Texas Co. No. 1-B Madison, sec. 19-17s-24e. Drlg. sdy. sh. 9,681 ft.

Texas Co. No. 3 Marrero Ld. Co., sec 29-17s-24e. R.U.

Texas Co. No. 9 Rigolet-Cooperation Fur Co., sec. 29-17s-24e. Cd. oil sd. 10,106-11 ft.; T.D. 10,214 ft.; D.S. stk at 8,034 ft.; shot at 7,099 ft.; fsg.

Lake Barre—Terrebonne Parish

Texas Co. No. 16 State, sec. 32-21s-19e. Drlg. sdy. sh. 2,786 ft.

Texas Co. No. 42 State-Lake, sec. 40-21s-19e. T.D. 6,704 ft.; D.S. stk.

Lake Long—Lafourche Parish

Fohs Oil Co. No. 4 State, sec. 64-17s-19e. 10¾-in. csg. 2,707 ft.; T.D. 10,239 ft.; 7-in. csg. 10,239 ft.; well blew out; killed; flwd. at rate of 50,000,000 ft. of gas per day.

Leesville—Lafourche Parish

Texas Co. No. 68 L.L.&E., sec. 27-21s-22e. T.D. 6,011 ft.; 7-in. csg. 5,971 ft.; I.P. 385 B.P.D.; ⅜-in. ck.

Lirette—Terrebonne Parish

Humble O. & R. Co. No. 1 Wurzlow, sec 32-19s-19e. Top sd. S.G. 8,423 ft.; T.D. 8,560 ft.; run csg.

Union Prod. Co. No. 1 Fundenburk, Unit 1, sec. 50-19s-19e. Drlg. sh. 9,647 ft.

Lockport—Calcasieu Parish

Continental Oil Co. No. 1 J. H. Moss, sec. 8-10s-9w. 10¾-in. csg. 986 ft.; drlg. sd. 4,275 ft.

New Iberia—Iberia Parish

H. Fotiades No. 6 Gulf Ld., sec. 25-12s-7e. Drlg. sh. 883 ft.
Wm. Helis No. 10 Bernard, sec. 54-12s-7e. T.D. 884 ft.; run surf. csg.
Wm. Helis No. 5 Bolivar, sec. 56-12s-7e T.D. 4,337 ft.; salt; P.B. and sdtrkd.; T.D. 3,594 ft.; 7-in. csg. 3,100 ft.; made sqz. job 3,070-80 ft.; P.B.; drlg. out 3,129 ft.
Wm. Helis No. 5 Schwing, sec. 56-12s-7e. T.D. 4,954 ft.; run 7-in. csg.
Texas Co. No. 4 Bryant, sec. 25-12s-7e. Drlg. salt 5,054 ft.
Texas Co. No. 2 Burke, sec. 56-12s-7e. Drlg. S.W. sd. 3,822 ft.
Texas Co. No. 7 Duke, sec. 26-12s-7e. R.U.

North Crowley—Acadia Parish

Humble O. & R. Co. No. 1 R. C. Davis, sec. 45-8s-1e. R.U.
Humble O. & R. Co. No. 2 Habetz, sec. 45-8s-1e. T.D. 8,160 ft.; run 7-in. csg.
Humble O. & R. Co. No. 1 Smith, sec. 44-8s-1e. 7-in. csg. 8,287 ft.; T.D. 8,855 ft.; abd.
Humble O. & R. Co. No. 1 Traham, sec. 3-9s-1e. 7-in. csg. 9,771 ft.; T.D. 10,632 ft.; abd.

Port Barre—St. Landry Parish

Emerson Oil Co. No. 5 Sibille Oil Co., sec. 20-6s-5e. T.D. 3,475 ft.; run csg.
T. C. Markley No. 1 Lahaye, sec. 4-6s-5e. R.U.
Pan American Prod. Co. No. 1 Lahaye, sec. 4-6s-5e. R.U.
Texas Co. No. 22 Botney Bay Lbr. Co., sec. 4-6s-5e. T.D. 3,569 ft.; P.B. 3,434 ft.; set csg. 3,434 ft.; perf. csg. 3,370-3,400 ft.; pmpg. S.W.

Quarantine Bay—Plaquemines Parish

Gulf Ref. Co. No. 4 State, sec. 17-19s-17e. T.D. 5,700 ft.; 9⅝-in. csg. 5,560 ft. drlg. sdy. sh. 9,204 ft.
Gulf Ref. Co. No. 5 State, sec. 17-19s-17e. Loc.
Gulf Ref. Co. No. 6 State, sec. 17-19s-17e. Driving piling.

Raceland—Lafourche Parish

Amerada Pet. Corp. No. 1 Godchaux Sugars, Inc., sec. 34-15s-19e. 18⅝-in. csg. 262 ft.; drlg. sdy. sh. 5,938 ft.
Amerada Pet. Corp. No. 2 South Coast Corp., sec. 35-15s-19e. 11¾-in. csg. 2,666 ft.; drlg. sd. 7,257 ft.

Sorrento—Ascension Parish

Pan American Prod. Co. No. 10 United Ld. Co., sec. 15-10s-4e. Drlg. sd.&sh. 824 ft.
Sorrento Oil Co. No. 2 White, sec. 22-10s-4e. Drk.

South Roanoke—Jeff Davis Parish

Continental Oil Co. No. 1 Joe Sturdivant, sec. 36-10s-4w. Drlg. sd. 5,984 ft.

South Elton—Jeff Davis Parish

Stanolind O. & G. Co.-Amerada Pet. Corp. No. 3-B Calcasieu Natl. Bank, sec. 2-7s-3w. T.D. 9,154 ft.; conditioning hole 9⅝-in. csg. 8,647 ft.; T.D. 13,210 ft.; D.S. stk.; P.B.; 7-in. csg. 9,230 ft.; P.B. 9,188 ft.; perf. csg. 9,140-55 ft.; no showing; P.B. 8,998 ft.; perf. csg. 8,990-98 ft.; flwg. 300 bbls. S.W.; ¾-in. ck.; W.P. 625 lbs.; trace of sd. and dist.; started making S.W.; killing to retest.

Starks—Calcasieu Parish

Lutcher-Moore Co. No. 5 fee, sec. 19-9s-12w. Drlg. sh. 2,387 ft.

Sulphur—Calcasieu Parish

Union Sulphur Co. No. 860 fee, 1,250 ft. W and 216 ft. N of C sec. 29-9s-10w. Drlg. sd.&sh. 5,429 ft.
Union Sulphur Co. No. 861 fee, sec. 29-9s-10w. T.D. 3,780 ft.; 7-in. csg. 3,775 ft.

Timballer Bay—Lafourche Parish

Gulf Oil Corp. No. 4 State, sec. 36-23-21e. T.D. 1,373 ft.; twisted off drill collar; sdtrkd. jnk.; cd. sd. 5,332-36 ft.; tstd. 3 stands drlg. mud, oil and sd.; cd. oil sd. 5,336-43 ft.; cg. oil sd. 5,353 ft.

Valentine—Lafourche Parish

Wm. Helis No. 1 Valentine-Sugars, Inc sec. 2-17s-20e. T.D. 7,134 ft.; P.B. and sdtrkd.; T.D. 7,068 ft.; P.B. 3,500 ft.; sdtrkd.; T.D. 7,057 ft.; abd.
Pan American Prod. Co. No. 2-B Community sec. 58-17s-20e. Drlg. sdy. sh. 3,968 ft.
Pan American Prod. Co. No. 17 Harang, sec. 9-17s-20e. Drlg. sdy. sh. 5,990 ft.

Venice—Plaquemines Parish

Tide Water Oil Co. No. 5 Manhattan Fruit Co., sec. 26-26s-30e. Top oil sd. 7,250 ft.; T.D. 7,300 ft.; P.B. 4,800 ft.; sdtrkd. at 4,813 ft.; cd. oil sd. 7,101-68 ft.; T.D. 7,290 ft.; 7-in. csg. 7,191 ft. perf. csg. 5,960-64 ft.; 10-min. D.S.T.; tstd. 120 ft. drlg. mud with oil odor; perf. csg. 5,964-68 ft.; recvd. 14 stnds. of oil, 3 stnds. of drlg. mud and sd.; making sqze. job; P.B. 3,650 ft.; sidetracked at 3,629 ft.; drlg. sh. 5,676 ft.
Tide Water Oil Co. No. 7 Manhattan Ld. & Fruit Co., sec. 26-21s-30e. 10¾-in. csg. 2,462 ft.; cd. oil sd. 7,128-45 ft.; run Schlumberger survey.

Vinton—Calcasieu Parish

M. McLean No. 17 Gray, sec. 35-10s-12w. R.U.; abd. loc.

Villa Platte—Evangeline Parish

Amerada Pet. Corp. No. 1 A. Fournier, sec. 44-3s-2e. Drlg. sh. 5,262 ft.
Continental Oil Co. No. 1 Hattie Haas, sec. 44-3s-2e. Drlg. sh. 8,525 ft.
Continental Oil Co. No. 1 Martha Haas, sec. 44-3s-2e. Drlg. sd. 8,889 ft.
Continental Oil Co. No. 1 Ludeau, sec. 45-3s-2e. Drlg. sh. 7,493 ft.
Continental Oil Co. No. 1 T. E. Vidrine, sec. 47-3s-2e. Drlg. sd.&sh. 9,978 ft.
Continental Oil Co. No. 1 J. E. Vidrine, sec. 46-3s-2e. Loc.

Welsh—Jeff Davis Parish

A. V. Peters No. 3 fee, sec. 22-9s-5w. Drlg. sh. 142 ft.
Stanolind O. & G. Co. No. 2 Conover, sec. 20-9s-5w. Drlg. sh.&L. 6,892 ft.

Woodlawn—Jeff Davis Parish

Union Sulphur Co. No. 3 Calcasieu Natl. Bnk., sec. 1-9s-6w. Drlg. sh. 6,333 ft.

S. LOUISIANA WILDCATS

Acadia Parish

H. E. Dalton No. 1 Setting, sec. 17-7s-1w T.D. 5,106 ft.; P.B. to approx. 500 ft.; T.D. 3,925 ft.; D.S. stuck.
Humble O. & R. Co. No. 1 Finch, sec. 22-10s-1e. 9⅝-in. csg. 7,474 ft.; T.D. 10,222 ft.; P.B. 7,318 ft.; perf. csg. 7,308-15 ft.; flwd. 21 B.P.H. first day and started making 75% S.W.; sqzd. off perf.; perf. csg. 7,311-13 ft.; flwd. 17 B.O.P.H. for 9 hrs. and started flwg. 50% S.W.; killed.

Avoyelles Parish

G. C. Koch et al No. 1 Kelone, sec. 21-2n-3e. 10¾-in. csg. 987 ft.; S.D. 6,021 ft.

Beauregard Parish

Republic Prod. Co. No. 1 Lutcher-Moore Lbr. Co., sec. 10-13w-6s. 10¾-in. csg. 1,015 ft.; T.D. est. 8,290 ft.; perf. csg.; flwd. gas and dist.; S.I.

Calcasieu Parish

Sun Oil Co. No. 1 Lutcher-Moore Lbr. Co., sec. 1-8s-13w. Cg. sh. 8,198 ft.
Wheeler Oil Corp. No. 2 Sch. Ld., sec. 16-9s-7w. 15½-in. csg. 46 ft.; S.D. 641 ft.

Cameron Parish

Humble O. & R. Co. No. 1 K. B. Hanzen, 466 ft. S and E, NW cor. SW¼ sec. 9-12s-6w. Drk.
Humble O. & R. Co. No. 1-B Miami Corp., sec. 7-14s-6w. 13⅜-in. csg. 2,150 ft.; T.D. 9,270 ft.; P.B. 8,850 ft.; drld. by fish; cg. sh. 9,978 ft.
Superior Oil Co. No. 1 Sells, sec. 5-15s-8w. T.D. 6,350 ft.; 10¾-in. csg. 6,350 ft.; drlg. sh. 8,125 ft.

Iberia Parish

Texas Co. No. 1 Bayless-Jones, sec. 58-12s-5e. T.D. 8,250 ft.; 9⅝-in. csg. 8,242 ft.

Texas Co. No. 2-B Vermilion Bay, sec. 2-16s-5e. T.D. 9,101 ft.; P.B. and sdtrkd. at 5,788 ft.; T.D. 7,020 ft.; P.B. 6,38 ft.; to sdtrk.; T.D. 7,623 ft.; P.B. 7,176 ft.; to sdtrk.; T.D. 7,348 ft.; 9⅝ in. csg. 7,263 ft.; drlg. sh.&L. 9,349 ft.

Jefferson Parish

Julius Szodomka No. 1 Carroll, sec. 12 12s-11e. Drlg. sdy. sh. 3,910 ft.

Lafourche Parish

Sun Oil Co. No. 1 Dilbert Stark, Brown Cypress Co., sec. 70-15s-15e. Drk.

Orleans Parish

W. T. Burton No. 1 State-Lake Pontchartrain, Twp. 10s-13e. Driving piling.

Plaquemines Parish

Gulf Oil Corp. No. 1 Grand Prairie Lve. Dist., sec. 6-20s-19e. Drk.

Pointe Coupe Parish

Batchelor Oil Co. No. 1 Hackney, sec 28-3s-8e. 20-in. csg. 117 ft.; 13⅜-in csg. 2,170 ft.; T.D. 9,990 ft.; abd.

Rapides Parish

J. J. Farrell No. 1 W. P. Aertker, sec 16-4n-1e. Drk.

St. Bernard Parish

Gulf Ref. Co. No. 3 State Lake, Twp. 12s-15e. 13⅜-in. csg. 1,558 ft.; 9⅝-in. csg. 6,486 ft.; drlg. sh. 7,202 ft.

St. James Parish

Continental Oil Co. No. 1 Realty Operators, sec. 17-12s-17e. 18⅝-in. csg. 302 ft.; 13⅜-in. csg. 2,473 ft.; cg. sd. 6,024 ft.

St. Landry Parish

Western Gulf Pet. Co. No. 1 St. Mary Ld. Co., sec. 7-8s-9e. Drlg. sh. 8,683 ft.

St. Martin Parish

Texas Co. No. 11 St. Martin Ld. Co sec. 21-8s-7e. Drlg. sdy. sh. 1,944 ft.

St. Tammany Parish

Ozro B. Phillips No. 1 A. J. Planche, sec. 28-6s-10e. Drlg. sd. 861 ft.

Terrebonne Parish

Barnsdall Oil Co. No. 1 R. R. Barrow, Inc., sec. 41-17s-18e. Drk.
Fohs Oil Co. No. 1 Buckley & Bourg, sec. 77-19s-17e. Stk. 7-in. csg. at 11,684 ft.; drlg. 12,606 ft.
Fohs Oil Co. No. 1 State, sec. 41-19s-19e. 18⅝-in. csg. 246 ft.; cd. sd. S.G. 6,894-6,915 ft.; T.D. 9,232 ft.; 9⅝-in. csg. 9,226 ft.; drlg. sh. 11,513 ft.
Shell Pet. Corp. No. 1 Laterre, sec. 73-18s-18e. Loc.
Shell Pet. Corp. No. 1 Realty Operators, sec. 10-18s-16e. Drlg. sh. 2,097 ft.

Vermilion Parish

Magnolia Pet. Co. No. 1 J. B. Ferguson, sec. 5-12s-2w. 13⅜-in. csg. 3,084 ft.; T.D. 7,692 ft.; rmg. to run csg.

Vernon Parish

W. T. Burton No. 1 Gulf Lbr. Co., sec. 32-1n-6w. Loc.

TEXAS

Week Ending May 21

GULF COAST FIELDS

Lockridge—Brazoria County

Gulf Oil Corp. No. 5 Carrie Baker, J. W. Hall Sur. No. 11. Drlg. sh. 4,312 ft.

Hastings Field—Brazoria County

E. M. Hailey No. 2 Blumer, H.T.&B. Sur No. 28. T.D. 6,111 ft.; S.D.; failed to flow.
Humble O. & R. Co. No. 6 B. H. Alexander, H.T.&B. Sur. No. 28. Drk.
Humble O. & R. Co. No. 10 South Tex. Grain Co., Perry & Austin Sur. Loc.
Stanolind O. & G. Co. No. 8-B Brown, H.T.&B. Sur. No. 29. Cg. sd. 5,510 ft.
Stanolind O. & G. Co. No. 1 Carrie B. Roberts, R. A. Magee Sur. R.U.
Stanolind O. & G. Co. No. 28-C W. R. Curkett, H.T.&B. Sur. No. 35. Drk.
Stanolind O. & G. Co. No. 19 Drake, H. T.&B. Sur. No. 36. Drlg. sh. 1,530 ft.
Stanolind O. & G. Co. No. 8 W. B. Wooster, A.C.H.&B. Sur. No. 1. Drk.

Old Ocean—Brazoria County

Harrison-Abercrombie No. 1 L. Augusburger, C. Breen Sur. 9⅝-in. csg. 7,011 ft.; drlg. sh. 10,217 ft.
Harrison-Abercrombie No. 1 David Kaufman, C. Breen Sur. Drlg. sh. 9,512 ft.
Harrison & Abercrombie Oil Co. No. 1 Troyer and West Texas Abst. Co., C. Breen Sur. T.D. 10,314 ft.; tstg.
Harrison & Abercrombie No. 1 I. N. Troyer, Chas. Breen Sur. Drlg. sh. 6,012 ft.

Pledger—Brazoria County

Danciger O. & R. Co. No. 1 Leona H. Carter, Grey & Moore Sur. T.D. 1,225 ft.; W.O.C.

West Columbia—Brazoria County

Adrian Moore No. 1 Gulf fee, Geo. Tennille Sur. Drlg. sh. 5,610 ft.
Frost and Dunnan No. 1 E. S. Parker, Geo. Tennille Sur. Drlg. sh. 4,312 ft.

Merrick Oil Co. No. 2 T. L. Smith, G. Tennille Sur. Drk.
Mike Hogg No. 2 Varner, W. Varner Lge. Drlg. sh. 5,786 ft.
Sterling O. & R. Co. No. 1 H. Perry, G. Tennille Sur. Drlg. 1,500 ft.
Sterling O. & R. Co. No. 2 Powers, G. Tennille Sur. Drk.
Texas Co. No. 21 Abrams, Geo. Tennille Sur. T.D. 5,433 ft.; P.B. to sdtrk.; drlg. sh. 5,229 ft.
Texas Co. No. 23 Abrams, G. Tennille Sur. Drlg. sh. 1,238 ft.
Texas Co. No. 5 Smith, G. Tennille Sur. Drlg. sh.&L. 2,830 ft.

Cedar Point Field—Chambers County

Humble O. & R. Co. No. 2 State, Tr. 95 T.D. 5,998 ft.; run csg.
Standard Oil Co. of Texas and Salt Dome Oil Co. No. 2 State, sec. 119. 16-in. csg. 286 ft.; 10¾-in. csg. 1,650 ft.; cg csg. 286 ft.; 10¾-in. csg. 1,650 ft.; T. D. 6,120 ft.; perf. csg. 6,040-98 ft.; tstg flwd. S.W.; sqzd. off perf. to reperf.

Seabreeze—Chambers County

Sun Oil Co. No. 2 Sea Breeze Land Co sec. 102, H.T.&B. Sur. T.D. 8,854 ft.; 7-in. csg. 8,837 ft.; tstg.

Greens Lake—Galveston County

Sun Oil Co. No. 2 Houston Farm Dev. Co., D. Buckley Sur. Drk.

Hitchcock—Galveston County

N. W. Hunter No. 3 M. Stewart, J. Spillman Sur. T.D. 5,154 ft.; top sd. 5,132-47 ft.; run csg.

Clinton—Harris County

Stanolind O. & G. Co. No. 1 Stalmark, Reels & Trobough Sur. Drk.
Stanolind O. & G. Co. No. 2 Edwards, Reels & Trobough Sur. Drk.

Eureka—Harris County

Allamo Drlg. Co. et al No. 3 Laura Lackner, H. Reinerman Sur. 9⅝-in. csg. 2,508 ft.; drlg. sh. 6,837 ft.

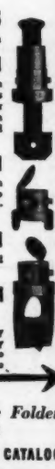
Why drill and take a chance of

WHEN YOU CAN *increase present production* **WITH A MILLER**

It's expensive business drilling wells, why not first get your maximum production from your present wells. Clean out the sand and sediment that is holding back the oil. The MILLER Sand Pump will do it quickly and at small cost.

The MILLER is made in diameters of 2½, 3, 3½, 4, 4¼, 5, 5½, 7 and 9 inches and lengths of 20, 25 and 30 feet. 5/32-inch wall thickness in REGULAR Type, ¼-inch wall tubes HEAVY Type Sand Pumps.

INTERCHANGEABLE BOTTOMS
To Meet Every Condition



- **BAILER BOTTOM** — With the Bailer Bottom installed the MILLER is quickly changed to a Bailer giving you a combination of either Bailer or a Sand Pump in one tool.
- **SAND BOTTOM** — Used when tools are run and when well is shot to quickly remove loose material.
- **STAR BOTTOM** — Used for cutting the sand loose.
- **CHISEL BOTTOM** (In Pump) — With this bottom tightly packed sand can be easily broken in small pieces so it can be picked up in the pump.

Write for Descriptive Folder and Price List

See Page 1186 COMPOSITE CATALOG

PATENTED
NO. 1370340
NO. 1372604
NO. 1707900
NO. 1962628
NO. 1965526
NO. 2059647

MILLER Sand Pump Co.

General Offices and Shop, Box 4516
OKLAHOMA CITY, OKLA., U. S. A.

Branch Shops and Offices:
SAPULPA, OKLA. and KILGORE, TEX.

FOR SALE BY SUPPLY STORES EVERYWHERE

J. Frazier, No. 2 Vollmer & Neiman, J. Reinerman Sur. Perf. csg. 7,717-30 ft.; tstg.
Houston Oil Co. No. 2 Helberg-Lackner, J. Reinerman Sur. Top oil sd. 7,691 ft.; T.D. 7,727 ft.
Tide Water Associated Oil Co. No. 1 Laura Lackner, J. Reinerman Sur. R.U.

Fairbanks—Harris County

H. A. Adams No. 3, J. P. Dawson Sur. Drlg. sh.&L. 3,630 ft.
Amerada-Stanolind O. & G. Co. No. 1 W. E. Denman, J. Waugh Sur. Drlg. 1,520 ft.
Amerada Pet. Corp.-Stanolind O. & G. Co. No. 1 Foley, J. Clarkson Sur. T.D. 6,853 ft.; perf. csg. 6,836-54 ft.; flwd. P.L.O.; started to make S.W.; reperf. csg.; flwd. oil and S.W.; killed.
Amerada-Stanolind O. & G. Co. No. 2 Mary Foley, J. Clarkson Sur. Loc.
Amerada-Stanolind O. & G. Co. No. 2 E. W. Mills, A. Lawson Sur. Drk.
Amerada Pet. Corp.-Stanolind O. & G. Co. No. 1 C. W. Hahl, W. K. Hamblin Sur. Drlg. 1,810 ft.
Amerada-Stanolind O. & G. Co. No. 1 A. Sebek, W. K. Hamblen Sur. R.U.
Amerada-Stanolind O. & G. Co. No. 1 J. F. Sebek, G. Williams Sur. Drk.
Amerada-Stanolind O. & G. Co. No. 1 E. W. Thompson, J. Clarkson Sur. Drk.
Carroll Oil Co. No. 1 Ralph Johnston, J. N. Dement Sur. T.D. 6,864 ft.; perf. csg. 6,839-43 ft.; would not flow; S.D.
Gem Oil Co. No. 4 B. W. Reid, G. Ayers Sur. Drk.
Housch-Thompson & Schofield No. 1 Windorf, G. Williams Sur. Drlg. sh. 1,530 ft.
Showers and Moncrief No. 1 G. W. Reid, J. Waugh Sur. Drlg. sh. 3,610 ft.
Smith and Ownby Drlg. Co. No. 1 E. M. White, J. Clarkson Sur. Drlg. 1,510 ft.
Union Prod. Co. No. 1 Goodykoontz, W. S. Powell Sur. Drlg. sh. 4,610 ft.
Windsor Oil Co. No. 1 Ley, J. Waugh Sur. Drlg. 1,310 ft.

Friendswood—Harris County

Humble O. & R. Co. No. 8 Beamer, T. Choate Sur. Drlg. sh. 1,230 ft.
Humble O. & R. Co. No. 2 G. R. Cottingham, T. Choate Sur. Drk.
Humble O. & R. Co. No. 3-B Goodwin, W. K. Smith Sur. Drlg. sh. 1,235 ft.
Humble O. & R. Co. No. 8 E. A. Grey, Perry & Austin Sur. T.D. 6,039 ft.; W.O.C.
Humble O. & R. Co. No. 2 Herman Hospital, T. Choate Sur. Drlg. sh. 4,839 ft.
Humble O. & R. Co. No. 3 Herman Hospital, T. Choate Sur. Drk.
Humble O. & R. Co. No. 1 J. L. Jones, Perry & Austin Sur. Drk.
Humble O. & R. Co. No. 1 Port City, T. Choate Sur. T.D. 6,042 ft.; W.O.C.
Humble O. & R. Co. No. 1x 2-A Port City Ice Co., T. Choate Sur. Drk.
Humble O. & R. Co. No. 3 J. H. Ross, Perry & Austin Sur. Drk.
Humble O. & R. Co. No. 1 E. E. Watson. Drk.

Cordele—Jackson County

H. J. Porter No. 1 Kern-Ackley, A. Baker Sur. R.U.
H. J. Porter No. 1 Ed Monia Pressley, Peter White Sur. Drk.
H. J. Porter No. 1 Woussi, Peter White Sur. Loc.

Clam Lake—Jefferson County

Shell Pet. Corp. No. 2 McFaddin, S. A. Pace Sur. Cd. oil sd. 5,553 ft.; drlg. sh. 7,110 ft.

North Cheek—Jefferson County

Magnolia Pet. Co. No. 4 J. H. Phelan, A. Stivers Sur. 18⅝-in. csg. 135 ft.; drlg. sh. 8,210 ft.

Hardin—Liberty County

Atlantic Ref. Co. No. 1-B McMurtry, A. B. Hardin Sur. Cg. sh. 7,357 ft.
Atlantic Ref. Co. No. 2 W. McMurtry, H. B. Johnson Sur. T.D. 7,871 ft.; 7-in. csg. on bttm.; perf. csg. 7,828-31½ ft.; jetting with gas.
Atlantic Ref. Co. No. 1 Richardson, A. B. Hardin Sur. Loc.
Fohs Oil Co. No. 2 Johnson-Finley, H. B. Johnston Sur. 9⅝-in. csg. 178 ft.; drlg. sh. 7,035 ft.
Gulf Oil Corp. No. 3-A J. C. Barfield, H. B. Johnston Sur. Drlg. sh. 3,965 ft.
Sun Oil Co. No. 2 Hisey, H. B. Johnston Sur. T.D. 7,708 ft.; 5¾-in. csg. 7,660 ft.; swbd. S.W.; perf. csg. 7,608-25 ft.
Woodley Pet. Co. No. 1 W. S. Partlow, H. B. Johnston Sur. Drlg. sh. 2,112 ft.
Woodley Pet. Co. No. 1 West et al. H. B. Johnston Sur. Drlg. sh. 4,615 ft.

Bay City—Matagorda County

Hamman Expln. Co. No. 2 Crooke, E. Hall Sur. Top sd. 9,660 ft.; tstg.; no report.
Hamman Expln. Co. No. 2 G. M. Sloan, J. T. Belknap Sur. Drk.

McCrosky—Matagorda County

Pierce Est. No. 3-A Pierce Est., D. Fenton Sur. Drlg. sh. 1,158 ft.

Palacios—Matagorda County

Bennett Prod. Co. No. 1 Foley Ld. Co., L. Goodwin Sur. Drlg. sh. 7,780 ft.
Sun Oil Co. No. 1 F. K. Robeson, L. Goodwin Sur. Drk.

Orange—Orange County

W. V. Bowles No. 1 J. H. Scales, Wm. Dyson Sur. Cg. 5,826 ft.
Ryan & Thompson No. 1 Walter-McGill, Wm. Dyson Sur. T.D. 6,123 ft.; rng. csg.; top oil sd. 6,112 ft.; 7-in. csg. 6,111 ft.; flwd. P.L.O. for 6 hrs.; went dead; swbd. S.W.; made sqze. job; drld. out 6,114 ft.; flwg. 26 B.F.P.H.; 25 to 30% S.W.; recmtd.; S.D.

Segno—Polk County

Gulf Oil Corp. No. 2 Ragan, I.&G.N. Sur 15. 9⅝-in. csg. 5,587 ft.; 20-min. D.S. T. 8,146-61 ft.; tstd. 2,400 ft. P.L.O.: 140 lbs. pres.; T.D. 9,154 ft.; perf. csg. 8,146-61 ft.; tstg.
Humble O. & R. Co. No. 8-B Kirby, M. Victor Sur. T.D. 7,506 ft.; tstg.

Spurger—Tyler County

Republic Prod. Co.-Houston Oil Co. No. 9, Hurd, N. Hurd Sur. T.D. 7,700 ft.; 7-in. csg. 7,660 ft.

GULF COAST WILDCATS

Brazoria County

Texas Co. No. 5 Freeport Sulphur Co., H. Burt Sur. Drlg. sh. 1,050 ft.

Brazos County

Pet. Heat & Power Co. No. 1 Minnie C. Dunn, J. M. Barrera Sur. S.D. 5,040 ft.

Burleson County

Red Bank Oil Co. No. 1 Coffield, E. Sante Sur. T.D. 6,171 ft.; flwd. oil; went dead; S.I.; installing flow valves.

Calhoun County

Adams & Lyles et al No. 1 Forster, Lemuel Walker Sur. Drlg. 3,630 ft.

Chambers County

Geo. Anderson No. 1 Julia Casey, W. D. Smith Sur. Loc.

Fort Bend County

Strake Pet. Corp. No. 1 G. L. Dew, D. Bright Sur. Drlg. sh. 3,910 ft.
Strake Pet. Co. No. 2 Sugarland Industries, Wm. Stafford Sur. Spd.

Galveston County

Sun Oil Co. No. 1 Atkins, Burrell Franks Sur. Drlg. sh. 5,968 ft.
Sun Oil Co. No. 1 Cade, A. Dickinson. 13⅜-in. csg. 2,218 ft.; T.D. 8,090 ft.; D.S. stk.

Harris County

J. Frazier-C. B. Bunte et al No. 1 Houston Deep Water Ld. Co., Thos. Earle Sur. Spd.
W. S. Howell No. 1 Root, A. McCormick Sur. S.D. 2,807 ft.; abd.
Merit Oil Co. No. 1 Guy Smith, F. Rankin Sur. 10¾-in. csg. 1,266 ft.
West Prod. Co. No. 1A fee, Geo. B. McKinstry Sur. Drlg. sh. 5,738 ft.; abd. 7,210 ft.

Jasper County

John Mayo No. 1 Cartwright, Legrande Sur. Drk.

Jackson County

Humble O. & R. Co. No. 1 J. R. Davis, I.&G.N. Sur. No. 20, Blk. 150. Drk.
Magnolia Pet. Co. No. 1 West Ranch, Ramon Musquez Sur. Drlg. sh. 5,212 ft.

Jefferson County

I. E. Harwell No. 1 State, Gulf of Mexico T.D. 5,840 ft.; D.S. stk.; pulled in two; S.D.; may abd.

Liberty County

John Mayo-Chapman Minerals No. 1 J. Blanding, J. Eldridge Sur. Drlg. sh. 4,929 ft.

Matagorda County

J. K. Dorrance No. 1 M. Adamcik, I.&G. N. Sur. No. 1. T.D. 7,512 ft.; P.B. 3,500 ft.; sdtrkd.; drlg. sh. 7,536 ft.
Rutherford Drlg. Co. No. 1 J. A. Birkner-Williams, Low, Thayton and Barter Sur. T.D. 8,415 ft.
Sun Oil Co. No. 1 Fred Robbins, C. H Vandeveer Sur. T.D. 10,160 ft.; well tried to blow out; 7-in. csg. 10,150 ft. perf. csg. 9,970-10,030 ft.; flwg. by hds.; went dead; reperf. csg. 9,430-9,520 ft.; tstg.
Texas Co. No. 1 C. T. Kountze, P. J. Poole Sur. T.D. 6,525 ft.; abd.

Montgomery County

J. Smith et al No. 1 J. V. Scott, F. A. B. Wheeler Sur. R.U.

Orange County

Texas Co. No. 1 H. J. Lutcher-Stark, Stephen Jett Sur. Drlg. sh. 7,639 ft.

Polk County

C. E. Gates No. 2 I. O. Jackson, J. W. Abbey Sur. Drk.

San Jacinto County

J. W. Oliphant No. 1 Gibbs, Chas. Memin Sur. Drlg. sh. 5,049 ft.

Trinity County

Boone Bros.-Jordan Drlg. Co. No. 1 Crauch, Joel Clapp Sur. Spd.; no report.

Tyler County

Glenn H. McCarthy No. 1 J. A. McShane. B.B.B.&C. Sur. No. 13. Drlg. sh. 3,410 ft.

Waller County

David MacDaniel No. 1 O. M. Dinkins, L. Pearsall Sur. R.U.
Stanolind O. & G. Co. No. 1 Freeman, H.T.&C. Sur. No. 99. Run 9⅝-in. csg; drlg. sh. 7,719 ft.

Medina County

F. A. Brown No. 1 Senne, A.C.H.&B. Sur. 105. Logged 8 ft. of sat. oil sd. 802-11 ft.; (corrected); 7-in. csg. 802 ft.; tstg.; T.D. 874 ft.; run lnr.
J. W. Cromwell No. 1 J. W. Tondre, I. J. Rogers Sur. T.D. 755 ft.; run csg.
D. K. J. Oil Co. No. 1 Burrell. T.D. 2,039 ft.; S.D. after swbg. dry.
S. F. Ewing No. 2 Riff, J. Haby Sur. No. 42. S.D. 750 ft.
Gee Hayes et al No. 1 Conrad, J. Keppler Sur. T.D. 485 ft.; run csg.
Owens and Dean No. 1 Ben Haby, Albert Kempf Sur. No. 37. T.D. 771 ft.; 7-in. csg. 637 ft.
Taylor & Pepper No. 1 Saathoff, Peter Eichorn Sur. S.D. 260 ft.
J. R. Trentman et al No. 1 Carle Merc. Co., V. A. Johnson Sur. T.D. 1,905 ft.; 7-in. csg. 1,835 ft.; csg. split; prep. to sqze. split with cmt.; S.D.
M. L. Walker No. 1 Zuberbuilen, A. Bonamy Sur. Drlg. 60 ft.; no report.

Milam County

Clark & Morgan No. 1 Johnson, Juan Jose Acosta Sur. S.D. 800 ft.
Texedo Oil Co. No. 1 Graham, Charles Cornea Sur. Logged S.O. 1,135-36 ft.; S.D. 1,760 ft.
Texedo Oil Co. No. 1 Paul Garves, C. Robertson Sur. S.D. 1,170 ft.; C.O.; set 7-in. csg. 1,167 ft.

Nueces County

Coast Line Oil Co. No. 1 State (Redfish Bay), State Tr. No. 32, S.D. 7,920 ft.; sd. logged from 7,338-56 ft.
J. W. Cosner No. 1 LaPrelle, Robert White Subd. of Hoffman Petronellia ranch. 10-in. csg. 1,010 ft.
Mills Bennett Prod. Co. No. 1 Fred Talley, sec. 10, Geo. Paul Subd. 10-in. csg. 759 ft.; S.D. 6,873 ft.

Refugio County

I. J. Allen et al No. 1 Rooke, Jose Miquel Aldrite & Jose Maria Aldrite 4½ Lge. Spd.

San Patricio County

Atlantic Ref. Co. No. 1 Jones, sec. 72, G. H. Paul Subd. of Coleman-Fulton Pasture Lds. R.U.
A. L. Bob No. 2 Green, T. T. Williamson Sur. S.D. 7,100 ft.
J. K. Culton No. 1 White Point Dev. Co., J. H. Sequin Sur. No. 4. T.D. 4,966 ft.; 7-in. csg. on bttm.; perf. csg. 4,925-35 ft.; tstg.
Humble O. & R. Co. No. 1 T. J. Carmody, sec. 22, Third Addn. of Taft farm lands. Drk.

Starr County

O. C. Borah No. 1 P. G. Garcia, Juan Salinas Sur. Drlg. sh. 657 ft.
O. C. Borah No. 2 Martinez, J. Salinas Sur. S.D. 370 ft.
O. C. Borah No. 7 Martinez, Joaquin Salinas Sur. S.D. 455 ft.
J. L. Collins No. 1 Francisco B. Guerra, Santa Cruz Gr. T.D. 6,609 ft.; well blew out; P.B. and sdtrkd.; drld. into old hole; S.D. 6,609 ft.; abd.
G. E. Dodd No. 1 Wardner, Porc. 84. T.D. 2,164 ft.; 4-in. csg. 2,146 ft.; swbd. dry; S.D.
G. E. Dodd No. 1-A Wood, V. Vela Sur. No. 84. S.D. 1,540 ft.
Henshaw-Davis No. 1 Garcia, M. M. Garcia Sur. Cd. oil sd. 2,675-82 ft.; 30-min. D.S.T. 2,672-82 ft.; tstd. 90 ft. of oil; slight show of brksh. wtr.; tstg. through perf. 2,662-69 ft.; flwg. 1½ bbls. oil per hr.; ½-in. ck.
Sioux Oil Co. No. 7 Ricaby, Porc. 83. Drlg. sh. 110 ft.
Sun Oil Co. No. 1 Young, J. Sisneros Sur. No. 79. Drlg. sh. 2,715 ft.

Travis County

R. F. C. Oil Co. No. 1 Jones, Reuben Hornsby Sur. No. 17. Drlg. 150 ft.; no report.
I. Ripp No. 1 Thaxton, Santiago De Valle Gr. S.D. 450 ft.
Texas Empire Trading Co. No. 1 E. E. Jourdan, Santigo Del Valle Gr. T.D. 709 ft.; 5½-in. csg. 611 ft.

Victoria County

W. V. Bowles No. 2 Robertson, T. C. Burnham Sur. Loc.

Webb County

C. C. Bonner No. 1 Lewis, W. P. Rutledge Sur. 460. Cg. sh. 2,034 ft.; no report.
Garrison & Paris No. 1 Benavides, Hale Subd. of M. Arispe Gr., C Blk. 107. Drk.
H. & H. Drlg. Co. No. 1 Laurel Bros., C.C.S.D.&R.G.N.G. Sur. No. 270. T.D. 2,850 ft.; abd.

Willacy County

Continental Oil Co. No. 2 Garcia Ld. Co., Blk. 118. Drlg. sh. 9,187 ft.
Magnolia Pet. Co. No. 1 Armendais, Sar Juan DeCarricitos Gr., Sh. 4. 8⅝-in. csg. 9,640 ft.; T.D. 9,960 ft.; set plug 9,593 ft.; T.D. 10,325 ft.; abd.

Williamson County

Marion Aldridge No. 1 Kroschewsky. T.D. 1,033 ft.; 7-in. csg. 969 ft.; S.D.

Wilson County

Stapper Oil Co. No. 1 J. McDaniel, L. Manchoca Sur. S.D. 933 ft.

Zapata County

R. B. Bryant No. 1 Flores, La. Huerta Sur. T.D. 1,556 ft.; stk. D.P.; jnkd. hole; skd. drk. 45 ft. north; drlg. sh. 3,113 ft.

EAST TEXAS

(Border counties)

Rodessa—Cass County

R. W. Norton No. 6 Moore, Meyers Sur. Cg. L. 5,947 ft.
Union Prod. Co. No. 2 Carter et al, Bryant Sur. Set 7-in. csg. 6,036 ft.; T.D. 6,110 ft.

Bowie County

King Oil Corp. No. 1 Watts, Geo. Brinlee Sur. Drlg. sh. 4,557 ft.

Harrison County

Ark.-La. Gas Co. No. 1 C. M. Abney, E. Little Sur. Set 7-in. csg. 2,350 ft.; set csg. 4,836 ft.; perf. 4,805-15 ft.; showed est. 30,000,000 ft. gas, spray S.W.; P.B whipstocked; milling out csg.

Marion County—Rodessa

Ark.-La. Gas Co. No. 3 Holland, Hanks Sur. Drlg. L.&sh. 5,052 ft.
Gulf Oil Corp. No. 1 Smith, Hanks Sur. Drlg. L.&sh. 5,450 ft.
Heyser, Heard & Clardy No. 3-B Henderson, U. Ewing Sur. Set 5½-in. 6,038 ft.; T.D. 6,060 ft.; comp.; 179 B.P.D.; ¼-in. ck.; T.P. 300 lbs.; C.P. 1,100 lbs.
Holcomb & Thomason No. 1 Bramlett, 245 ft. S line, 20-ac. lse., 400 ft. E line, Gentry Sur. R.U.
Holcomb & Thomason No. 2-B Henderson, Ewing Sur. Drlg. sh.&L. 5,789 ft.
Hollandsworth Drlg. Co. No. 1 Brantley, Bennington Sur. Set 5-in. csg. 5,986 ft.; T.D. 6,017 ft.
Illinois Pet. Co. No. 1 Hale, Hanks Sur. Drlg. rd. bds. 4,185 ft.
Ohio Oil Co. No. 2 Moseley, Francis Sur. Drlg. L.&sh. 5,400 ft.
Phillips Pet. Co. No. 1 Beard, Bennington Sur. Set 7-in. csg. 6,088 ft.; T.D. 6,100 ft.; perf. 6,019-29 ft.; swbg. small S.O.; drld. out plug to 6,075 ft.
Shell Pet. Corp. No. 2-B Henderson, Bennington Sur. Drlg. sh.&L. 5,770 ft.
Shell Pet. Corp. No. 2 Schulter, Smith Sur. Drlg. sh.&L. 4,550 ft.
Shell Pet. Corp. No. 3 Schulter, S. Smith Sur. Drlg. sh. 3,266 ft.
Union Prod. Co. No. 8 Hutchinson, Coy Sur. Drlg. sh.&anhy. 5,880 ft.

Panola County

Mallard & Locke No. 1 W. E. Roller Est., Sullins Sur. Set 9⅝-in. csg. 761 ft.; W.O.C.
Texas Co. No. 1 Claude Adams, T. Cox Sur. Set 9⅝-in. csg.; drlg. 7,593 ft.

Sabine County

Pet. Heat & Power Co. No. 1 Jasper State Bnk., McDonald Sur. Spdg.

Shelby County

Center Oil Co. No. 1 Windham, A. H. English Sur. Cg. 3,406 ft.

S. W. TEXAS WILDCATS

Atascosa County

G. D. Curly and R. E. Phalon No. 1 Henritta Kresch, J. C. Dierks Sur. S.D. 20 ft.
G. C. Richardson No. 1 Fisher, Beaty & Moulton Sur. 1013. T.D. 500 ft.; abd.
S.W.R. Corp. No. 1 Miller, J. Neill Sur. T.D. 702 ft.; abd.

Bastrop County

R. C. Franklin No. 2 Yarrington, Jose Manuel Bangs Sur. Drlg. 210 ft.
Humble O. & R. Co. No. 1 Hellsman, J. Cunningham Sur. T.A.C. 5,631 ft.; drlg.
Del Rio 6,487 ft.
Ralph Ogden No. 1 Storey, Henry Warnell Sur. S.D. 620 ft.
Western Gulf Pet. Corp. No. 1 T. M. Moon, Jacob L. Standifer Sur. No. 15. R.U.

Bexar County

Nami Herman No. 1 W. F. Fields, A. Bustillos Sur. T.D. 514 ft.
Luling O. & G. Co. No. 1 Russell, Fernando Rodriquez Sur. T.D. 1,480 ft.; Edw. L.; P.B. 1,180 ft.; acdzd.; pmpd. 38 bbls. fluid, 8 hrs., 60% sulfur wtr. S.I.

Caldwell County

Banke Miller Oil Co. No. 1 Martindale, Hector McNeil Sur. T.D. 2,635 ft.
Jan Oil Co. No. 1 Chew, J. McCoy Sur. T.D. 2,022 ft.; 5½-in. csg. 1,930 ft.; tstg.
Mencill Pet. Co. No. 1 J. Wallinger, Gedeon Pace Sur. S.D. 536 ft.
C. R. Richardson No. 1 Schowe, T. Maxwell Sur., Abst. 188. S.D. 850 ft.

Cameron County

Saxet Prod. Co. No. 1 Port Isabel Irrig Co. Sur 30. Drk.
E. B. Whittington No. 1 Gilmer, H. C. Williams Sur. No. 62. R.U.

De Witt County

Mayo Oil Co. No. 1 W. D. McCurdy, John Hunt Sur. R.U.

Dimmitt County

Texas & Maryland Corp. No. 1 McKnight Blk. 13, sec. 23. Base of Austin Chalk 6,201 ft.; top Georgetown L. 6,120 ft.; 5½-in. csg. 7,094 ft.; T.D. 7,141 ft.; P.B. 2,850 ft.; swbd. S.W.; shot with nitroglycerin 2,451-56 ft.; blew out; killed; found csg. parted 900 ft. from top; fsg.; P.B. 1,900 ft.; to sdtrk.

Duval County

Henry Brown No. 1 Guy Est., M. E. Gussett Sur. S.D. 3,207 ft.
Verne Clopton No. 1 Denn, H. K. Allison Sur. R.U.

N. V. Duncan No. 1 Neeley, R. F. Neeley Sur. No. 284. Spd. and S.D.

Frank Gravis No. 1 Megargal, J. Boyles Sur. 10-in. csg. 500 ft.; S.D.

H. & H. Drlg. Co. No. 1 Hagist, B.S.&F. Sur. No. 271. T.D. 1,500 ft.; abd.

Magnolia Pet. Co. No. 1 Gray, E. N. Gray Sur. Drlg. sh. 220 ft.

Magnolia Pet. Co. No. 1 Weill Est., Sur. 496. T.D. 2,074 ft.; tstg.

H. J. Porter No. 1 Fitzsimmons, J. Poltevent Sur., sec. 291. Tstd. 450 ft. P.L. O.; 90 lbs. pres. on D.S.T. 4,265-4,305 ft.; T.D. 4,303 ft.; 7-in. csg. 4,292 ft.

Rowan & Hope No. 1 Cuellar, B.B.B.& C. Sur., sec. 96. 10¾-in. csg. 198 ft.; drlg. sh. 3,150 ft.

Standard Oil Co. of Texas No. 1, Dolores Garcia Sur. R.U.

Edwards County

Evans & Love No. 1 Steve Brown, Blk. 6. G.W.T.&P. Sur. S.D. 6,261 ft.

Frio County

F. L. Thompson No. 1 Davis, G.B.&C.N. G. Sur. No. 1. S.D. 4,140 ft.; cd. oil sd. 3,722-59 ft.

Goliad County

Bunte Prod. Co. No. 1 Crews, Maria Jesusa DeLeon Sur. R.U.

Gonzales County

Heard-Hall & Young No. 1 Clark, Robt. S. Armistead Sur. Drlg. 43 ft.; no report.

Guadalupe County

Benstrasser No. 1 Eickenroht, A. Marrs Ennaurrezar Sur. R.U.

Hidalgo County

Hidalgo Prod. Co. No. 1 Daskam Corp., Porc. 45, Blk. 34. Drlg. sh. 3,837 ft.

Jim Hogg County

Humble O. & R. Co. No. 1 Anna Kelsy Bass, San Rafel Gr. 10¾-in. csg. 1,207 ft.; cg. sdy. sh. 4,329 ft.

Jim Wells County

E. Calloway et al No. 1 E. O. Cook, Lavaca Grant Sur. Cg. sh. 3,686 ft.

W. J. Coates No. 1 Lindsay & Reed, Lavaca Gr. Drlg. sh. 5,075 ft.

Conroe Drlg. Co. et al No. 1 Lindsay & Reed, Lavaca Gr. Cg. sh. 4,683 ft.

Cox & Hamon No. 1 W. R. Perkins, Lavaca Gr. T.D. 5,602 ft.; abd.

Walter Goldston No. 1 Lindsay & Reed, LaVaca Gr. Run csg. to test 5,100 ft.

H. H. Howell et al No. 2 Lindsey, Lavaca Gr. T.D. 5,446 ft.; run Schlumberger.

H. H. Howell No. 3 Lindsay et al, Lavaca Gr. Sur. Cg. 4,237 ft.

Humble O. & R. Co. No. 1 Tarrant, J. Poltevent Sur. T.D. 3,638 ft.; making D.S.T.

Magnolia Pet. Co. No. 1 Valades Hrs., La Anima Sola Gr. R.U.

Richardson Pet. Co. No. 2 Garcia, R. E. L. King Sur. T.D. 6,255 ft.; abd.

Southern Minerals Oil Corp. No. 1 J. R. Trussells, Lavaca Gr. 10¾-in. csg. 540 ft.; drlg. sh. 4,610 ft.

Kerr County

Edminston No. 1 Saul, Sur. 47. S.D. 55 ft.

Kleberg County

Pure Oil Co. et al No. 1 State Ld., Tr. 68, Laguna Madre Bay, Lse. No. 528 Spd.

La Salle County

Finley S. Ewing No. 1 Pugh, E. L. Garrett Sur. S.D. 780 ft.

Eugene Garner No. 1 Yeager, Lot 6, Wallace Subd. of Sur. No. 39. R.U.

Lee County

Eleoussa Oil Co. No. 1 Sanders, J. Vir Roeder Sur. T.D. 4,398 ft.; prep. to resume drlg.

Live Oak County

R. H. Feltner No. 1 Reed, I.&G.N. R.R. Sur. 15. R.U.

Gilcrease Oil Co. No. 1 Brannan, B.S.& F. Sur. Drlg. sh. 2,120 ft.

Hantho-Nelson No. 1 Geo. West, G. L. Haas Sur. T.D. 4,011 ft.; abd.

Holland Oil Co. No. 1 West Est., C. Q. Ragland Sur. 10¾-in. csg. 189 ft.

J. I. Newton No. 2 Geo. West, James Wright Sur. 10-in. csg. 189 ft.; cg. sh. 1,881 ft.; no report.

V. G. Schimmel et al No. 1 Geo. West, G. L. Haas Sur. T.D. 210 ft.

Transwestern Oil Co. No. 1 Stephens, C. F. Simmons Subd., sec. 74. T.D. 2,354 ft.; abd.

McMullen County

N. V. Duncan No. 1 Nueces Ld. & Livestock Co., B.S.&F. Sur. No. 119. Drk.

R. C. Lipscomb No. 1 Shiner, sec. 54, Shiner ranch. Cd. oil sd. 1,365-70 ft.; tstg. 1,752 ft.; swbd. some oil; S.D.

S. M. Nesser No. 1 Franklin, J. Poltevent Sur. No. 33. Loc.

G. G. Newton No. 1 Bryne, Geo. Pettuck Sur. S.D. 670 ft.

Reynolds & Richardson No. 3 Shiner, Shumway Subd. of Shiner ranch. R.U.

V. G. Schimmel No. 1 Jefferson O. & G. Co., C. P. Wright Sur. No. 92. T.D. 2,759 ft.; abd.

E. C. TEXAS WILDCATS

Angelina County

J. C. Bonham No. 2 Cameron Lbr. Co., E. Miller Sur., 3 mi. SE of Zavalla Drlg. 2,357 ft.

Ginter Bros. No. 4 Copes Heirs, J. Morin Sur., 3 mi. S of Dibol. R.U.M.

Camp County

W. C. McGlothlin No. 1 Joe Venters, S. Wright Sur., 3 mi. SE of Leesburgh. M.I.M.

Cherokee County

Bunn Drlg. Co. No. 1 C. Bounds, W. H. Walters Sur., 2½ mi. SE of Lone Star. D.&A. 5,510 ft.

Commerade Oil No. 1 J. M. King, W. Bartie Sur., 5 mi. W of Rusk. Drlg. 5,510 ft.

J. G. Mayo No. 1 Travis, T. Quevada Sur., 2 mi. SE of Mt. Selman. Plts.

Dallas County

Markraley No. 1 R. S. Morris, C. Gibbs Sur., 2 mi. S of Grand Prairie. Drlg. 2,400 ft.

Plaza Oil Co. No. 1 Davidson, Marchants Sur., 1 mi. NW of Seagoville. Drlg. 2,360 ft.

Ellis County

Julian Ivy No. 1 Sadie Serf, C. J. Chambers Sur., 6 mi. E of Alma. S.D. 80 ft.

Gregg County

Humble O. & R. Co. & Gulf O. Corp. No. 1 E. Robertson, M. Mann Sur., 2¼ mi. SW of Longview Trinity test. El. 279 ft.; prep. test 10,275 ft.

Henderson County

Hager & Jones No. 1 Coleman & Faulk, R. S. Rayburn Sur., 2 mi. NW of La Rue. U.R. 2,890 ft.

Jones-Mallory No. 1 A. Mallory, T. S. Mitchell Sur., 6 mi. SW of Mabank. S.D. 107 ft.

L. Johnson No. 1 J. L. and W. D. Coffee, S. Whitley Sur., 5 mi. SW of Paynes. Drlg. 70 ft.

Richards & Holloway No. 1 J. P. and T. Tarkington, W. Kenewell Sur., SE of Flag Lake. M.I.M.

Texas Co. No. 1 I. A. Nolan Parsons Sur., 1 mi. SW of Flag Lake. Tstg. 3,036 ft.

Tyler & Smith No. 1 Phoenix Rlty. Co., A. L. Adams Sur., 4 mi. S of Mabank. D.&A. 3,212 ft.

Houston County

Humble O. & R. Co. No. 1 Daily & Taylor, J. G. Thompson Sur. Drk.

Peyton Bros. No. 1 J. N. Daniels, J. M. Procella Sur., ½ mi. N of Procella. D.&A. 6,042 ft.

Sun Oil Co. No. 1 R. S. and H. H. Daily, J. G. Thompson Sur., 3 mi. SE of Navarro Crossing. Drlg. 5,409 ft.

Lamar County

Dahl & Barr No. 1 Lewis & McQuiston, R. Russell Sur., 1 mi. NE of Paris. Drlg. 840 ft.

Limestone County

J. S. Cosden, Jr. No. 1 J. J. Bower, J. Breeding Sur., near Prairie Hill. Drlg. 1,011 ft.

McLennan County

Kilgore No. 1 J. M. Marrs, J. S. Rutland Sur., 2 mi. S of Bosque. S.D. 1,455 ft.

Lisle Steele No. 1 C. H. Cherry, M. Martinez Sur., 4½ mi. SE of Waco. W.O.C. 40 ft.

Russell & Thompson No. 1 L. L. Phillips, C. O. Campo Sur., 4 mi. S of Waco. Drlg. 740 ft.

Madison County

C. K. Handy No. 1 D. G. Cannon, D. Arriola Sur., 6 mi. NW of Madisonville. S.D. 236 ft.

Navarro County

J. O. Griffiths No. 1 Haynes, Able Parsons Sur., 4 mi. NE of Kerens. Loc.

Mrs. Jane Robinson No. 1 Fortson Bros., Ell Smith Sur., 5 mi. NE Corsicana Drlg. 2,710 ft.

Red River County

Daniels et al No. 1 J. J. Gaston, J. Guest Sur., 2 mi. S of Detroit. Bldg. drk.

Texas Trading Co. No. 2 So. Pine Lbr. Co., D. D. Bruton Sur., 12 mi. N of Clarksville. Cg. 2,095 ft.

Walters et al No. 1 Phamplin, W. Moore Sur., 3 mi. SE of Kanawha in NW part of county. W.O.C. 68 ft.

Rusk County

J. W. Merrick et al No. 1 Peter Tipps, T. Uzzell Sur., 6 mi. S of East Texas field and 5 mi. N of New Salem. Deepening from 3,888 ft.; S.D. 3,983 ft.

Smith County

H. L. Hunt et al No. 1 S. H. Bradly, T. P. Payne Sur., 10 mi. E of Tyler at Chappel Hill. S.D.W.O. 7,529 ft.

Titus County

L. Umbernhour No. 1 Sykes, J. Mathews Sur., 1 mi. N of Winfield. O.T.D. 3,888 ft.; prep. deepen.

Trinity County

Boone & Jordan No. 1 U. S. Crouch, Joel Clapp Sur., 7 mi. N of Trinity. W.O.C. 200 ft.

Gassage et al No. 1 Mrs. C. H. Elliot, Joel Clapp Sur., 6½ mi. N of Trinity. Drk.

Upshur County

E. J. Dupree No. 1 W. A. Lawrence, R. Polly Sur., 4 mi. S of Gilmer. S.D. 3,520 ft.

Tom Hunter and American Liberty No. 1 J. P. Carter, J. H. Fields Sur. Drlg. 9,083 ft.

Van Zandt County

Hines & Hancock No. 1 J. L. Chitty, N. Neal Sur., 7 mi. SW of Canton. O.W. T.D. 2,180 ft.; R.U. to deepen.

NORTH TEXAS WILDCATS

Archer County

Adams O. & G. Co. No. 1 C. Moer, sec. 21, C.&P. Sur., Blk. 3. S.S.O. 4,135-65 ft.; tstg.

Burns & Omohundro No. 1 Dr. A. B. Edwards, Blk. 44, L. P. Hunt Subd., 5,300-ft. test. Loc.

Camp Drlg. Co. No. 1 H. Harmel, sec. 2,460, T.E.&L. Sur., 4,000-ft. test. Drlg. 4,003 ft.

Fain-McGaha Oil Corp. No. 1 R. W. Fuller, Blk. 1, H.&T.C. Sur., 6,000-ft. test. Coring sat. L. 5,106-15 ft.

Harvey Drlg. Co. No. 1 J. J. Perkins, sec. 7, A.N.T.C.L. Sur. Drlg. 2,450 ft.

Helmerich & Payne et al No. 2 L. F. Wilson, Blk. 25, A.T.N.C.L. Sur. Testing at 5,105-16 ft.

Hines & Hancock No. 1 J. L. Anderson, Blk. 23, Anderson ranch, 4,000-ft. test. Drlg. 3,382 ft.

Hines & Hancock No. 1 W. R. Hammond, H. Corzine Sur. A-56. Drlg. 2,438 ft.

Kilgore-Luginbyhl & Johnson No. 1 Ford, T. M. Cecil Sur. A-982. 4,500-ft. test; tstg. S.S.O. 4,131-45 ft.

Thos. A. Jirik No. 1 Kunkel, sec. 2, P.R.R. Sur. A-1186. Drlg. 800 ft.

Lacreta Pet. Co. No. 1 L. H. Farmer, W. C. Winters Sur. A-663, 4,000-ft. test. Drk.

Reno Oil Co. No. 10 H. Wilmut A, sec. 4, S.P.R.R. Sur. A-1044. S.S.O. 3,760-66 ft.; 6⅝-in. 3,750 ft.; W.O.C.

Baylor County

Riddels, Pipes & Holcomb No. 1 W. H. Nichols, Jr., sec. 117, B.B.B.&C. Sur. A-85. Loc.

Wilcox O. & G. Co. No. 1 W. H. Portwood, sec. 3144, T.E.&L. Sur. Drk.

Clay County

Walter Gant No. 1 Bryant Edwards, S. C. Beldon Sur. A-12, 6,000-ft. test. S.D. 4,713 ft.

Healdton O. & G. Co. No. 1 Wallace, Belcher Subd. S.D. 5,801 ft.

Joe Rogers No. 1 C. P. Davis, Blk. 6, Montague Co. School Land Sur. A-307, 4,500-ft. test. Spud. and S.D.

Wood Pet. & Roy. Corp. No. 1 I. H. Kempner, Blk. 44, Bosque Co. Sch. Ld. Sur. A-10. Drlg. 2,320 ft.

Cooke County

Sinclair Prairie Oil Co. No. 1 J. M. Best, T. Toby Sur. A-1054. Drlg. 4,805 ft.

Sunset Oil Co. No. 1 J. T. Donald, S.P. R.R. Sur. A-971 3,500-ft. test; S.S.O. 2,473-94 ft.; S.D.O.

Foard County

Texas Co. No. 16 Johnson, sec. 37, S.P. R.R. Sur. Gas sd. 3,538-58 ft.; 6⅝-in. 3,530 ft.; drlg. 3,568 ft.

Jack County

Noah Daves No. 1 K. D. Baker, sec. 2709, T.E.&L. Sur., 4,000-ft. test. Drlg. 1,710 ft.

Harper Pet. Co. 1 Mary E. Norman. A. Pearson Sur. A-1304. O.S. 1,937-38 ft.; testing.

Montague County

H. H. Powell No. 1 Arch Durham, W. J. Wagoner Sur. A-936. S.D. 822 ft.

J. W. Sorrell et al No. 1 J. E. Walthal Sam H. Smith Sur. A-662. S.D. 3,777 ft.

Wichita County

C. W. Boller No. 1 S. Y. Collins, Charles Roberts Sur. A-540. 6⅝-in. 3,855 ft.; brkn. sdy. L. and O.S. 3,860-3,900 ft.; testing.

Geo. W. Cooper No. 1 Parker, sec. 13, H.&G.N. Sur. S.D. 3,790 ft.

Madden & Goldsmith No. 1 Jackson, Blk. 20, Denton Co. Sch. Lds. Drlg. 4,120 ft.

Shell Pet. Co. No. 1 Reilly, F. Jordan Sur., Abst. 167. Drlg. 4,501 ft.

E. J. Stump No. 1 F. C. Dodson, J. Deck Sur. A-52. R.U.R.

Young County

Byars & King No. 1 Street, sec. 303, T.E.L. Sur. Drlg. 3,005 ft.

Cosden Oil Co. No. 1 Price, Y.C.S.L. Sur. No. A-1285. Drlg. 2,710 ft.

Cosden Pet. Corp. No. 1 D. R. Sewell B, J. Bray Sur. A-1949. Drlg. 2,655 ft.

Fain-McGaha No. 1 Logan, Blk. 18, Holeman Sur. Drlg. 3,380 ft.

A. N. Munhall No. 1 Ed Johnson, A. McLennan Sur. A-185. 6⅝-in. 3,935 ft.;S.L. 3,990-4,350 ft.; testing; flwd. while rng. 5/8-in.

RANGER (CENTRAL TEXAS) DISTRICT

Callahan County

Cooper, Weeks & Hughes No. 1 C. D. Straley, 660 ft. from W L., 1,880 ft. from N L. sec. 370, Geo. W. Denton Sur. Ordovician test; drlg. 3,700 ft.

Joe Gallagher No. 1 W. T. Harris, 200 ft. from S line, 1,050 ft. from E line sec. 347, G. W. Denton Sur. 2,000-ft. test, 5 mi. N Oplin. S.D. at 400 ft.

J. H. Howell No. 1 E. I. Vestal, 1,149 ft. E line, 1,000 ft. N line, Jesse Dyson Sur., 2 mi. NE Cross Plains, rotary to 4,000 ft. Surf. to 100 ft.; S.D. at 600 ft.

J. C. Jackson et al No. 1 Thompson, 2 mi S. Eula, sec. 30, B.B.B.&C. Sur. S.D 1,803 ft.; drlg. 2,390 ft.

Petroleum Drlg. Co. No. 1 Cook & Jordan, 760 ft. from E L, 1,838 ft. from N L, sec. 350, Geo. Hancock Sur. Ordovician. Drlg. 2,000 ft.

Wittmer Oil & Gas Properties, Inc., No. 1 R. D. Williams et al, 300 ft. from N line, 467 ft. from W line sec. 2,269, T.E.&L. Sur., 2 mi. NE Putnam, 4,500-ft. test. Set 12¼-in. at 1,048 ft.; show oil 1,795-1,803 ft.; set 10-in. 2,556 ft.; S.O. in Ellenburger 4,077 ft.; T.D.; W.O. 7-in. csg.

Coleman County

Anzac Oil Corp. et al No. 1 Sparkman, Samuel Crooks Sur. Drlg. 1,640 ft.

Anzac Oil Corp. No. 1 Burk, A. Williams Sur. Drlg. 210 ft.

F. L. and E. R. Cooper No. 1 W. R. Stockard, 330 ft. from NL, 330 ft. from WL, N½ SE¼ sec. 23, T.&N.O. Sur. Rotary to 3,650 ft.

S. M. Devine et al No. 1 Masterson, 2 mi. W of Burkett, Asa Wickson Sur. Drlg. 1,837 ft.

Garrett Oil Co. No. 1 W. S. Smith et al., 4 mi. SE Coleman, J. Thiele Sur. 2,300-ft. test; T.D. 2,035 ft., show gas; set csg. and tstg.

Comanche County

N. D. Gallagher et al No. 1 Mrs. B. L Terry. Desdemona pool, N. H. Kuykendall Sur. S.O. in Ellenburger; 5 gal. sulfur and salt water on D.S. test; S.D.O. 4,978 ft.

Eastland County

Dobbs Oil Co. No. 1 Greer, J. E. Hardy Sur., Ellenburger test. Drlg. 300 ft.

Dorothy Oil Co. No. 1 Mrs. J. L. Johnson, 1,000 ft. from S line, 1,080 from W line, E½ SW¼ sec. 29-4, H.&T.C. Sur. Rigging.

Hayner, Reaves & Hose No. 1 P. L. Larkin, 3 mi. NW Rising Star, 912 ft. from W line, 546 ft. from S line, NW¼ sec. 40-2, E.T.R.R. Sur. S.O. 2,525-53 ft. and 2,574-95 ft.; cmt. 7-in. 3,004 ft.; W.O.C.

Neil A. Moore No. 7 Holcomb Heirs, 970 ft. from W line and 600 ft. from N line, SW¼ 1-4, H.&T.C. Sur. Loc.

Fisher County

Forest Dev. Corp. & Daube No. 1 L. G. Bennett, 660 ft. from N & E lines, sec. 51-3, H.&T.C. Sur. Rotary to 4,500 ft.; 3 mi. SW of Rotan. Set 10-in. at 300 ft.; drlg. 877 ft.

Owens-Snebold & A. C. Varner No. 1 J. H. Milsap, 3,500-ft. wildcat, 2 mi. NW McCaulley, 330 SL 330 WL, sec. 61-2, H.&T.C. Sur. Drlg. 1,429 ft.

Haskell County

Algord Oil Co. No. 1 J. F. Jones, 330 ft. from S and W lines, E. T. Roche Sur. No. 4, Abst. 525. Loc.

Fain-McGaha Oil Corp. No. 1 T. G. Hendrick, C W½ sec. 104, Indianola Ry. Sur. Set 150 ft. of 12½-in. S.S.G. 1,620-30 ft.; show oil 2,700-02 ft. in sand; tstg.

Forest Dev. No. 2 A. E. Pardue, 2,100 ft. from N line, 550 ft. from W line, M. Collum Sur. No. 4. Top Adams Branch 2,794 ft.; cored oil sat. 2,806-07 ft.; cmt. 7-in. 2,794 ft.; W.O.C.

J. W. and A. E. McMillan No. 1 A. E. Pardue, 440 ft. from N and W lines, S½ M. Collum Sur. No. 4 A-685. Rotary to 3,500 ft.; oil 2,810-54 ft.; cored 2,835-54 ft.; set 6-in. to T.D. and cmtd. 125 sacks; shot 39 perf. from 2,810-44 ft.; wtr.; shot 44 perf. 2,795 to 2,815 ft., filled 375 ft. in 15 min., set packer to cmt off bottom wtr.; W.O. gauge.

Jones County

Brown Eagle & C. J. Kleiner No. 1 Sullivan Heirs, 330 ft. S&E of 200-ac. tract in S. Andrews Sur. 191. Drlg. 1,787 ft.; drlg. 2,080 ft.

L. A. Hedrick No. 1 W. D. Baker, 220 ft. from N&W lines 3½ NE¼ sec. 36-O.A.L. Abnd. 2,475 ft., T.D.

Humble No. 1 Riley Horton, 330 ft. from N line, 330 ft. from E line, sec. 40-18-T.&P. Sur. Drlg. 1,650 ft.

Iron Mountain No. 1 D. J. Herbst, 5 mi. E Hamlin, 330 ft. from N and E Sub. 18, Austin Williams Sur. 339. Set 10-in 2,245 ft.; wtr. 2,900-05 ft.; H.F.W. 3,150 ft.; drlg. 3,260 ft.

Chas. J. Kleiner No. 1 Mrs. A. E. Carlson, 333 ft. from S and E lines, NW¼ sec. 19-3, H.&T.C. Sur. Rigging.

F. W. Martin No. 1 B. N. Herndon, 330 ft. from S and W of NW sec. 1, M.E.&P. Sur. Drlg. 3,060 ft.

F. W. Merrick et al No. 1 C. A. Cox, cent. Cox 119-ac. tr., J. H. Hughes Sur. No. 201. Sho. O.&W. 2,322-28 ft.; U.R. 6-in. to 2,390 ft.

Oil States Exploration No. 1 J. E. Sellers, 100 ft. from S line, 330 ft. from W line, S. Andrews Sur. 191. Drlg. 500 ft.

Shaheen Oil Co. and Big Six No. 1 P. L. Telford, 220 ft. N and W lines, E½ SW¼ sec. 49-15, T.&P. Sur. Abnd. 2,236 ft., T.D.

W. L. Snoddy & C. C. Dodson No. 1 C. L. Steffens et al, 220 ft. from S and W lines SW¼ NE¼ sec. 32-15, T.&P. Sur. Drlg. 1,700 ft.

Stanton & Miller No. 1 Gaither, 4½ mi. N of Anson, sec. 38, B.B.B.&C. Sur. S.D. 2,180 ft.

Ungren & Frazier No. 1 W. E. Fellows, 990 ft. from N line, 330 ft. from E line, S½ sec. 25-15, T.&P. Sur. Drlg. 1,700 ft.

Joe A. Worsham et al No. 1 J. H. Commons, 330 ft. from E line, S¼ E 80-ac. Subdiv. 8, A. W. Hill Sur. No. 4. Abnd. 3,396 ft., T.D.

Nolan County

Hantho-Nelson, Inc., No. 1 J. H. Withers, C SW¼ sec. 65-21, T.&P. Sur. Wildcat

to drill 4,000 ft. Spd. to 200 ft. W.O. rotary.

Shackelford County

Danciger No. 3 J. E. McCown, 300 ft. from N and E lines, S½ SE¼ sec. 158, B.B.B. &C. Sur. Drlg. 2,400 ft.

Joe DeGrazier No. 1 Harbough, E cen part of county, sec. 1,563, T.E.&L. Su 4,500-ft. test; H.F.W. 2,185-95 ft.; drlg. 2,600 ft.

Forest Dev. & Helmerich & Payne No. 1 L. G. Hendrick, C sec. 1, A.B.&M. Sur. To deepen with rotary past 3,163 ft.

J. G. Hammond No. 1 Coker, 1,620 ft. from S line and 1,020 ft. from W line, sec. 159, B.B.B.&C. Sur. U.R. 8-in. at 1,960 ft., T.D.

Ungren & Frazier No. 1 J. S. McKeever, 406 ft. from W line, 354 ft. from N line, NW¼ SW ¼ sec. 14-3, H.&T.C Sur. 3,500-ft. test.; gas at 1,475 and 1,492 ft.; set 10-in. 1,539 ft.; est. 100,000 ft. gas 1,745 ft.; set 10-in. to 1,907 ft; top Palo Pinto 3,196 ft.; drlg. 3,204 ft.

Stephens County

Graham, Hafner, Lane & Inman No. 1 J N. Yocum, 5 mi. SE of Frankell, 250 ft. from N and E lines of farm or approx. 2,525 ft. from E line and 1,400 ft. from S line of John R. Carter Sur Trt. 1.000 gal acid 3.575-90 ft.; est. 25 50 bbls. per day; drlg. 3,455 ft.

Lone Star Gas Co. No. 5 R. W. Brooks 400 ft. E and S of C of sec. 54-7, T.&P. Sur. Ellenburger test 2½ mi. N of Van Parmer pool. Est. 3,000,000 ft. gas 2,160-70 ft.; T.D. 2,175 ft.

Lone Star No. 1 J. S. McKee, 660 ft. from N line, 660 ft. from W line, sec. 41-7, T.&P. Sur. Drlg. 1,150 ft.

G. Willard Rich No. 1 J. W. Andrews, 330 ft. W line, 450 ft. S line, NW¼ sec. 39-7 T.&P. Sur. Set 12½-in. at 1,620 ft.; drlg. 3,300 ft.

Stonewall County

Bert Fields No. 1 R. P. Pierson, C of E 80-ac., E. A. & S. M. Lee Sur. Abst 817. M.I.R.

General Crude Oil Co. No. 1 J. D. Smith SW cor. county, 330 ft. from S and F lines of sec. 371, H.&T.C. Sur., Blk. 2 Set 13⅜-in. 2,119 ft.; set 10-in. at 3,508 ft.; cmt. 150 sacks; S.S.O. at 3,970 ft.; U.R. 8-in. 4,105 ft.

F. B. Parriott No. 1 H. T. Carlile, 330 ft. from S line, 990 ft. from E line SW¼ NE¼ sec. 293, Blk. D, H.&T.C Sur., rotary to 5.500 ft., 6 mi. NW of Swenson. Set 8¼-in. at 3.345 ft.; set 6-in. to 3,896 ft.; drlg. 4,200 ft.

Taylor County

Lewis Production No. 1 L. Henslee, 330 ft. from E L of 234-ac. tract in J. A. Nabors Sur. No. 10 and sec. 27-17, T.&P. Sur., 4 mi. E of Merkel. Drlg. 1,000 ft.

Wichita Prod. Co. No. 1 J. H. Parramore, 592 ft. from E line, 400 ft. from S line, SW¼ sec. 81-14, T.&P. Sur. Abnd. 2.035 ft.

Throckmorton County

Jones & Stasney No. 1 C. T. Brockman, 330 ft. S line, 330 E line sec. 95. Comanche Indian Sur. Est. 5 to 10 million ft. gas 1,434-48 ft.; drlg. 2,100 ft.

Marland-Drake No. 1 Dickie Bros., center T.E.&L. Sur. 2226. Drlg. 3,400 ft.

Morris & Spoonts No. 1 Alden Bros., NW cor. county, 1,350 ft. from E line and 5,210 ft. from S line of Raymond Sanches Sur. A-248. Drlg. 1,178 ft.

White & Duncan No. 1 Reynolds Cattle Co., 330 ft. from S and W lines, NE¼ sec. 83, Comanche Indian Reservation Set 10-in. at 1,405 ft.; drlg. 2,060 ft.

Henry Zweifel No. 1 J. H. Lee, 4 mi. NE of Woodson, 930 ft. from E line and 2,011 ft. from S line of J. A. George Sur. S.S. oil 3,902-06 and 3,914-20 ft.; T.D. 3,924 ft.; set 6-in. and cmt. 3,894 ft.; W.O.C.

Canadian Fields

(Continued from Page 112)

On the Kootenay dome west of Calgary, Roxana Petroleums No. 1, section 8-24-7w5, is underreaming preparatory to resuming from 3,790 feet after the winter shut down. Production is expected in the Lower Devonian limestone at somewhat less than 4,800 feet.

On the Highwood Sinclair structure southwest of Turner Valley, Green Valley Oils No. 1 Banner, LSD 6, section 34-17-3w5, is resuming in the Madison limestone from 5,794 feet.

On the Watson structure, Mar Jon Oil Co. of Vancouver, British Columbia is arranging to complete its No. 3 well in LSD 3, section 4-10-2w5 from 5,520 feet.

Border Fields

In the Taber field, southern Alberta, Plains Petroleum Corp. No. 4, LSD 15, section 25-9-17w5, is below 1,000 feet after cementing casing at 815 feet to shut off water flow in the Milk River sand. Plains No. 5, LSD 2, section 36-9-17w4, had derrick partly erected. North Taber Royalties No. 1, LSD 7, section 10-11-15w4, had cellar finished and is hauling derrick timbers.

In the Barnwell area, Border Petroleums, Ltd., of Calgary, is unloading materials at the Canadian Western No. 6 well, and will deepen for oil. Kamorley Oils, Ltd., of Victoria, British Columbia, has been reorganized as Taber-Kamorley Oils, Ltd., to drill in the Taber field. Directors are E. T. Brown of Calgary; T. Ford of Sidney B. C., and G. H. Meredith, H. W. R. Moore and J. H. Beatty, all of Victoria, B. C.

In the Lethbridge area, Lethbridge Petroleums & Refining No. 1, LSD 12, section 11-8-22w4, is deepening after cleaning out caving at 2,261 feet. South of Lethbridge, Northwest Co. No. 1 Oxland, LSD 8, section 1-8-21w4, is deepening after cementing 13⅜-inch casing at 231 feet.

On the Montana side, A. B. Cobb No. 1 State, section 30-37-4w, deepening from 2,570 feet, got a gas flow estimated 24,000,000 feet a day. The flow is under control and the hole will be deepened for oil. Location is about 6 miles south of the Alberta boundary, and results will affect operations in a considerable area of southern Alberta.

East Central Alberta

On the Ribstone structure, east central Alberta, Blackfoot-Ribstone Oils No. 1, SE quarter section 28-43-2w4, is resuming after setting surface pipe at 325 feet. Oil sand is expected around 1,900 feet.

British Columbia

Hon. T. D. Pattullo, premier of British Columbia, has announced that the provincial government is planning to explore the oil possibilities of some 66,000 square miles in the Peace River district in the northern part of the province. Financing of the development program will be taken up at the next session of the legislature. The area is in wild country, west of Peace River and Pouce Coupe areas of northern Alberta.

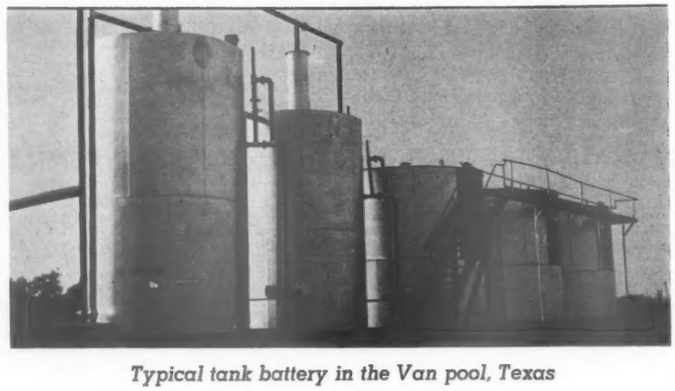
Ontario Operations

In the Dover field, Kent County, Ontario, Prairie Oil & Gas Co. No. 6, Orville Crow farm, Lot 6, Front Concession, Raleigh Township, is pulling casing, after getting the granite at 3,700 feet. No production was found in the Trenton limestone. Prairie No. 7 has been located on the north side of the river in Dover Township, on the H. Thomas farm, W half S Cut Extension Road, just west of the Prairie Siding bridge.

In Lambton County, Gas Producers Syndicate of Detroit has started shallow oil operations north of Shetland, in Euphemia Township. Gas Producers No. 1, Dobbyn farm, finished at 350 feet with 2 bbls. a day pumping production. About 30 years ago several shallow wells in this area developed up to 50 bbls. a day flush production.

STOCKS HELD IN PACIFIC COAST TERRITORY BY CALIFORNIA COMPANIES

	March 31, 1938	February 28, 1938	March changes	Dec. 31,1937 reclassified
1. Fuel oil residuum and non-gasoline-bearing crude	76,907,466	74,428,663	+ 2,478,803	68,529,388
2. Gas oil and diesel oil	9,241,322	9,103,824	+ 137,498	8,648,990
3. Gasoline-bearing crude	31,556,951	31,104,054	+ 452,897	29,417,842
4. Unblended natural gasoline	2,549,761	2,390,076	+ 159,685	2,001,204
5. Gasoline (not including distributing and serv. stat'ns)	15,452,752	15,134,960	+ 317,792	13,520,678
6. Naphtha distillates	*1,666,410	*1,587,174	+ 79,236	*1,464,577
7. All other stocks	†4,994,964	†4,778,383	+ 216,581	†4,457,568
Total	142,369,626	138,527,134	+ 3,842,492	128,040,247
* Estimated amount unfinished gaso. contained in item 6	1,474,686	1,389,001	.....	1,248,291
† Coke included in item 7	22,105	22,142	.....	22,435



Typical tank battery in the Van pool, Texas

STANDARD OIL CO. OF CALIFORNIA AND UNION OIL CO.

Crude oil prices at the well effective June 22. 1936

Gravity—	Signal Hill (Long Beach)	Seal Beach	Alamitos Heights	Huntington Beach	Inglewood	Playa del Rey	Olinda-Brea Canyon	Athens-Rosecrans	Dominguez	Elwood Terrace	Torrance	Richfield	Whittier E. Coyote (La Habra)	Montebello	W. Coyote Hills	Santa Fe Springs	Mountain View	Elk Hills Buena Vista Hills Midway-Sunset Lakeview Area	Lost Hills	Coalinga	Wheeler Ridge	Kettleman Hills	Santa Paula*	Orcutt*
14-14.9	$.80	$.79	$.74	$.78	$.79	$.80	$.76				$.80	$.76	$.76	$.77	$.78			$.70	$.70	$.70			$.70	
15-15.9	.80	.79	.74	.78	.79	.80	.76				.80	.76	.76	.77	.78			.70	.70	.70			.70	
16-16.9	.80	.79	.74	.78	.79	.80	.76				.80	.76	.76	.77	.78			.70	.70	.70			.70	$.70
17-17.9	.80	.79	.74	.78	.81	.80	.76				.80	.76	.76	.77	.78			.70	.70	.70			.71	.70
18-18.9	.80	.79	.74	.78	.84	.80	.78				.82	.76	.76	.77	.78			.70	.70	.70			.73	.72
19-19.9	.82	.79	.74	.82	.87	.84	.81				.85	.76	.78	.77	.78		$.70	.74	.74	.71	$.70		.75	.74
20-20.9	.85	.79	.74	.85	.90	.88	.84				.88	.78	.82	.77	.80		.70	.78	.78	.72	.70		.77	.77
21-21.9	.88	.79	.74	.89	.93	.93	.88				.91	.80	.85	.77	.84	$.78	.73	.82	.82	.74	.70		.79	.80
22-22.9	.92	.82	.74	.92	.96	.98	.92				.93	.84	.89	.79	.88	.78	.77	.87	.86	.78	.72		.82	.83
23-23.9	.95	.86	.77	.96	.99	1.02	.96	$.84	$.79		.96	.88	.93	.82	.92	.78	.80	.92	.90	.82	.76		.85	.86
24-24.9	.99	.91	.80	1.00	1.02	1.06	.99	.88	.81		.99	.91	.96	.85	.96	.82	.84	.97	.94	.86	.79		.87	.88
25-25.9	1.03	.95	.82	1.03	1.05	1.11	1.03	.93	.83		1.02	.95		.89	.99	.86	.88	1.01	.98	.90	.83		.90	.91
26-26.9	1.06	1.00	.85	1.07	1.09	1.16	1.06	.98	.86		1.05	.98		.92	1.03	.90	.91	1.06	1.02				.92	.93
27-27.9	1.10	1.05	.88	1.11	1.12		1.10	1.03	.88			1.02		.96	1.06	.95	.95	1.10	1.06				.95	
28-28.9	1.14	1.10	.90	1.14	1.15		1.14	1.07	.90			1.06		.99	1.10	.99	.99	1.15	1.10				.97	
29-29.9	1.17	1.15	.93	1.18	1.18	F.O.B.	1.17	1.12	.93			1.09		1.03	1.14	1.03	1.02	1.20	1.14				.99	
30-30.9	1.21	1.19	.95	1.22	1.21	our	1.21	1.17	.95	F.O.B.				1.07	1.17	1.08	1.06	1.25	1.18				1.01	
31-31.9					1.24	Pipe	1.24	1.22	.97	Ship				1.11	1.21	1.12	1.09	1.29						
32-32.9					1.27	Line	1.27	1.27	1.00					1.14	1.25	1.16	1.13	1.34						
33-33.9								1.32		$1.28				1.18	1.28	1.20	1.17	1.38				$1.19		
34-34.9								1.37		1.32				1.22	1.32	1.25	1.20					1.23		
35-35.9								1.42		1.35				1.25		1.29						1.27		
36-36.9								1.46		1.39				1.29		1.33						1.31		
37-37.9								1.51		1.43				1.32		1.37						1.35		
38-38.9								1.56						1.36		1.42						1.39		
39-39.9								1.61						1.40								1.43		
40-40.9								1.66						1.43										

Newhall, McKittrick, Kern River, Kern Front and Round Mountain, 70 cents for all grades. *Posted by Union Oil Co. Same company's Brea Canyon schedule stops at $1.14 for 28 degrees and over, and Beiridge and Lost Hills schedule stops at $1.32 for 37 degrees and over. By Standard Oil Co., effective October 15: El Segundo, 14 to 18.9 degrees, 80 cents; 19-19.9, 82 cents; 20-20.9, 85 cents; 21-21.9, 88 cents; 22-22.9, 92 cents; 23-23.9, 95 cents; 24-24.9, 99 cents; 25-25.9, $1.03; 26-26.9, $1.06; 27-27.9, $1.10; 28-28.9, $1.14; 29-29.9, $1.17; 30-30.9, $1.21. Wilmington, 14 to 16.9, 75 cents; 17-17.9, 77 cents; 18-18.9, 79 cents; from 19 degrees upward, prices same as Signal Hill.

WEST TEXAS WILDCATS

Andrews County

Atlantic Rfg. Co. No. 1 Texas Univ., sec. 26, Blk. 11, University Lands. Drlg. 3,050 ft.
H. S. Forgeron No. 1 Lockhart-Brown. W.O.C. 4,493 ft.
Perkins, Wright & McMillan No. 1 Cowden. U.R. 7,699 ft.
Rhodes & Tompkins No. 1 Emma Cowden, sec. 1, Blk. 44, T.&P. Sur. Spdg.
Rogers & Rogers No. 1 O. B. Holt, P.S.L. Sur. Tstg. 4,511 ft.
Seaboard Oil Corp. No. 1 Munger-Nix sec. 1, Blk. A-4, P.S.L. Sur. S.D.O. 4,526 ft.
Seaboard Oil Corp. No. 1 Thornberry, sec. 8, Blk. 42-A, P.S.L. Sur. Drlg. 4,626 ft.
A. C. Wheeler No. 1 T. M. Gardner, sec 15, Blk. A-35, P.S.L. Sur. Prep. to plug and abd. 4,779 ft.

Bailey County

Duffey & Etz No. 1 Enochs, Tract 66, League 182. Floyd Co. School Lands Sur. Drlg. 4,295 ft.

Brewster County

H. D. Wilcox No. 1 Kokernot, sec. 12, Blk. C, J. V. Massey Sur. Drlg. 1,810 ft.

Cochran County

Devonian-Honolulu-Cascade No. 1-C-8 Duggan, sec. 8, Oldham C.S.L. Sur. Drlg. 2,050 ft.
Heimerich & Payne No. 1 Westheimer & Daube, Lab. 14, Leg. 147. Prep. drill ahead 4,733 ft.
Honolulu Oil Co. No. 1-91 C. S. Dean, League 91, Lipscomb C.S.L. Sur. W.O.C. 4,850 ft.
Texas Co. No. 1 Mallett Ld. & Cattle Co., sec. 7, Blk. G, P.S.L. Sur. Prep. acidize.

Coke County

H. E. Ogden No. 1 Rawlins, sec. 390, Blk. 1-A. Drlg. 3,450 ft.
Barnett Pet. Co. No. 1 J. R. Mims, sec. 89 Blk. W, T.&P. Sur. S.D. 1,861 ft.

Crane County

Gulf Oil Corp. No. 4 McKnight, sec. 3, Blk. B-21, P.S.L. Sur. Drlg. 1,753 ft.
Magnolia Pet. Co. No. 1 University, sec. 16, Blk. 30, University land, 3½ mi. NW of Church-Fields pool. P.B. 3,380 ft.; tstg.

Crockett County

H. W. Black & Eubank Oil No. 1 University, sec. 13, Blk. 14, University Sur. P.B. 1,420; prep. test.
W. L. Bradley et al No. 1 Hoover, sec. 1, Blk. 1. Comp. 15 B.O.P.D.
Choate & Hogan No. 1-H University, Univ. Sur., sec. 14, Blk. 14. Drlg. 680 ft.
Choate & Hogan No. 1-J University, sec. 15, Blk. 14, University Sur. P.B. to shoot 1,595 ft.
Short & Gillette No. 1 J. W. Owens, Jose Zunegas Sur. W.O. cs. 393 ft.
W. F. Yates No. 1 Hoover, sec. 6, blk. 1, G.C.&S.F. Sur. Abd.

Culberson County

Harry J. W. Nichaus No. 1 C. M. Caldwell, sec. 15, Blk. 109, P.S.L. Sur. Prep. lower 10-in. 1,820 ft.
S. J. Isaacs No. 1 L. G. Sheddan, sec. 25, Blk. 52, P.S.L. Sur. Loc.
Quito Oil Co. No. 1 Cameron Lbr. Co., sec. 24, Blk. 81, P.S.L. Sur. Drlg. 105 ft.

Dickens County

J. F. Marrisey No. 1 I. J. McMahan, sec. 319, Blk. 1, H.&G.N. Sur. M.I. larger machine 1,050 ft.

Ector County

Stogner et al No. 1 Hendrick, sec. 4, Blk. 43, T.&P. Sur. Drlg. 3,435 ft.

El Paso County

Tri-State Oil Co. No. 1 Kinkel. S.D.O. 3,571 ft.

Fisher County

Dibrell & Patton No. 1 J. B. Stribling, sec. 110, Blk. 3, H.&T.C. Sur. Spd. and S.D.

Floyd County

Mills Bennett No. 1 T. Montgomery, F. J. Latham Sur., 6 mi. S of Floydada. Rng. whipstock 5,014 ft.

Gaines County

C. M. Cope et al No. 1 Riley, Blk. G, sec. 249, W.H.R.R. Sur. W.O.C. 4,950 ft.
Eastland Oil Co. No. 1 R. C. Dunbar, sec 24, Blk. A-12, P.S.L. Sur. W.O.C. 4,640 ft.
Finley & Cherry No. 1 P. W. Dalmont, sec. 6, Blk. A-21, P.S.L. Sur. Comp. D.&A. 4,923 ft.
Riddle & Warr No. 1 J. B. Brown et al, sec. 26, Blk. G, C.&M.R.R. Sur. M.I.M.

Garza County

Gulf Oil Corp. No. 1 Swanson, sec. 25, Blk. 2, H.&G.N. Sur. Drlg. 4,896 ft.

Glasscock County

O. B. Greathouse No. 1 Burns, sec. 221, Blk. 29, W.&N.W. Sur. S.D.R. 95 ft.

Hockley County

Gulf Oil Corp. No. 1 Mallett Ld. & Cattle Co., sec. 6, Blk. X, P.S.L. Sur. P.B. 5,037 ft.; tstg. 5,037 ft.

Howard County

H. N. Harriss No. 1 Guitar, sec. 17, Blk. A, Bauer & Cockrell Sur. R.U.
Lockhart Oil Co. No. 1 Scott, sec. 88, Blk. 29, W.&N.W. Sur. C.O. 2,865 ft.
Magnolia Pet. Co. No. 5 O'Daniel, sec. 34, Blk. 30, T.&P. Sur. R.U.S.T. 1,750 ft.
T. G. Shaw No. 1 H. N. Wilkerson, sec. 35, Blk. A, Bauer & Cockrell Sur. Loc.
Texas Co. No. 1 H. H. Wilkinson, sec. 32, Blk. 34, T.&P. Sur. D.&A. 3,505 ft.

Hudspeth County

Haymon Krupp Oil & Ld. Co. No. 1 Thaxton, SE¼ sec. 34, Blk. 74, Twp 6. Drlg. 4,379 ft.
Haymon Krupp No. 1 Briggs, sec. 24, Blk. 73, Twp. 7, T.&P. Sur. Drlg. 4,016 ft.

Jeff Davis County

Joiner Oil Corp. No. 1 Jones-Coffield. Drlg. 3,700 ft.

Kent County

Thad A. Bryant Jr. No. 1 Haggins et al, sec. 118, Blk. 1, H.&G.N. Sur. Abd. loc.

Lynn County

John L. Baldridge No. 1 Alma Lbr. Co., sec. 151, H.E.&W.T. Sur. W.O. 7-in. 4,450 ft.

Martin County

W. D. Anderson No. 1 J. R. Vance, sec. 9, Blk. 36, T.&P. Sur. Drlg. 485 ft.

Menard County

C. D. Haggerty No. 1 Callon, sec. 36, Jim Franz Sur. Fsg. 675 ft.
Hartzell-Nawn & O'Hara No. 1 Wilhelm, sec. 24, Blk. A-1735, Indianola R.R. Sur. S.D. 590 ft.

Pecos County

Cox & Moore No. 1 White & Baker, sec. 43, Blk. Z, T.C.R.R. Sur. Drlg. 185 ft.
Ed Falvey No. 1 Trees, sec. 63, Blk. 8, H.&G.N. Sur. Fsg. 2,055 ft.
J. D. Kugle, Jr., No. 1 W. C. Jackson, sec. 120, Blk. 8, H.&G.N. Sur. Tstg. 2,075 ft.
Carl S. Leidecker No. 1 Iowa Trust, sec. 73, Blk. 10, H.&G.N. Sur. Drlg. 1,760 ft.
Magnolia Pet. Co. No. 1 McKee. Prep. drill deeper 6,111 ft.
E. R. Minshall et al No. 1 Haynie, sec. 28; Blk. 146, T.&St.L. Sur. Drlg. 1,327 ft.
S. Thompson No. 1 Elsinore Cattle Co., sec. 54, Blk. D, G.C.&S.F. Sur. S.D. 7,212 ft.
Trans-Pecos Oil Co. No. 1 Gallagher, T.&P. Sur. S.D.O. 2,240 ft.
Trans-Pecos Oil Co. No. 3-A Papham, G.H.&S.A. Sur. S.D. 2,015 ft.

Presidio County

L. C. Brite No. 4 fee, C NW¼ sec. 113, Blk. 12, G.H.&S.A. Sur. S.D.O. 5,427 ft.

Reeves County

Grisham Hunter Corp. & N. A. Grisham No. 1 Geo. Daniel, sec. 40, Blk. 58, T.&P. Sur. Drlg. 3,445 ft.
Ohio Oil Co. No. 1 Papham, sec. 18, Blk 54, T.&P. Sur. C.O. 1,742 ft.; T.D. 2,380 ft.

Runnels County

Stevens & Glober No. 1 Fowler, sec. 150, E.I.R.R. Sur. S.D. 1,355 ft.

Scurry County

Coffield & Guthrie No. 1 E. E. Spears et al, sec. 130, Blk. 97, H.&T.C. Sur. Drlg. 1,188 ft.
Robinson Drlg. Co. No. 1 Martin, sec. 147, H.&T.C. Sur. P.B. 2,500 ft.

Sterling County

Loffland Bros. & Moore Bros. No. 1 D. D. Parramore, sec. 23, Blk. 2, H.&T.C. Sur. R.U.R. 725 ft.
J. W. Sward No. 1 Brennand, sec. 107, Blk. 2, H.&T.C. Sur. Prep. run 8-in. 1,320 ft.

Stonewall County

Bert Fields No. 1 J. M. Lee, J. E. Pierson Sur. S.D. rotary 125 ft.
General Crude Oil Co. No. 1 J. D. Smith, sec. 371, Blk. 2, H.&T.C. Sur., 12 mi. N Rotan. U.R. 4,105 ft.
Swanson & Parriott No. 1 H. T. Carlisle, sec. 293, Blk. D, H.&T.C. Sur. Drlg. 4,145 ft.

Terry County

L. E. Hults No. 1 P. J. Ross, sec. 6, Blk. D-14, C.&M.R.R. Sur. R.U.S.T. 4,749 ft.

Tom Green County

Humble O. & R. Co. No. 1 Lewis & Wardlaw, sec. 5, Blk. 17, H.&T.C. Sur. Rng. electrical survey 7,586 ft.; last report.
Spinner No. 1 Reed, Mason Ferry Ranch Sur. Drlg. 4,480 ft.

Upton County

Flippen & Hancock No. 1 Shirk Est., sec. 7, Blk. 3, M.K.&T. Sur. W.O.C. 2,678 ft.; last report.
W. D. Riser et al No. 1 King Ranch Oil & Lignite Co., sec. 8, Blk. 3, M.K.&T. Sur. S.D. 730 ft.

Val Verde County

J. F. Carter et al No. 1 Seller & Sons, sec. 34, Blk. A, I.&G.N. Sur. Spd. and S.D.

Ward County

M. J. Delaney No. 1 J. E. Cooper, H.&T.C. Sur. Tstg. 2,092 ft.
J. E. Fitzpatrick et al No. 1 H. B. Carr, sec. 125, Blk. 34, H.&T.C. Sur. S.D.R. 1,325 ft.
J. E. Fitzpatrick et al No. 1 F. K. Dyer, sec. 135, Blk. 34, H.&T.C. Sur. Drlg. 4,400 ft.
Hoss & Downey No. 1 Meyers, sec. 17, Blk. 32, H.&T.C. Sur. C.O. 1,945 ft.
Hoss & Downey No. 1 Ross Avery, sec. 36, Blk. 1, H.&T.C. Sur. S.D. 2,000 ft.
Mahree No. 1 Wilson, sec. 133, Blk. 34, H.&T.C. Sur. S.D. lost tools at 5,099 ft.
Patillo & Webster No. 1 Johnston. Comp. 18 B.O.P.D.
John Poindexter No. 1 V. Meyers, sec. 17, Blk. 32, H.&T.C. Sur. Drlg.
O. E. Schkode No. 1 Boogher, sec. 1, Blk. 32, H.&T.C. Sur. Tstg. 278 B.O.P.D.; S.L. storage full 2,078 ft.; prep. shoot 2,105 ft.
Texas Co. No. 1-F Univ., Univ. Sur., Blk. 16, sec. 15. R.U.S.T. 2,742 ft.

Winkler County

Ed. L. Gelder No. 1 R. D. Kessler & F. Kessler, sec. 14, Blk. B-3, P.S.L. Sur. Drlg. plug 3,086 ft.

Yoakum County

Gulf No. 1 J. C. Futch, sec. 796, Blk. D. J. H. Gibson Sur. U.R. 5,010 ft.
Gulf States Oil No. 1 Graham, sec. 267, Blk. 3, J. H. Gibson Sur. Prep. measure up 5,377 ft.
Heimerich & Payne No. 1 S. O'Dowd, sec. 896, Blk. D, J. H. Gibson Sur. U.R. 4,955 ft.

WEST TEXAS COMPLETIONS

(24-hour gauges)

Andrews County

Fuhrman No. 10 Ford, 4,248-4,455 feet, 1,857 bbls. Sinclair Prairie No. 2 Gowan, 4,250-4,483 feet, 75 bbls. Humble Oil & Refining Co. No. 44 J. S. Means, 4,500-40 feet, 380 bbls.

Crane County

Atlantic No. 3-A Utex, 2,350-3,553 feet, 2,754 bbls.

Crockett County

W. J. Bradley No. 1 Hoover, 1,417-2,173 feet, 15 bbls. W. F. Yates No. 1 Hoover, abandoned location. Choate & Hogan No. 1-I University, 1,438-1,573 feet, 41 bbls.

Howard County

Continental No. 15 Overton, 2,430-2,500 feet, 1,200 bbls. Iron Mountain Oil No. 5 Snyder, 2,700-2,913 feet, 749 bbls. Texas Co. No. 1 H. H. Wilkerson, dry and abandoned at 3,505 feet. Moore Brothers No. 3-A Snyder, 2,589-2,804 feet, 1,487 bbls. (correction).

Ector County

Sinclair Prairie No. 4 University, 3,475-3,650 feet, 295 bbls. Barnsdall No. 13 H. Foster, 4,150-4,270 feet, 801 bbls. Continental No. 2 Johnson, 4,120-4,240 feet, 259 bbls. Barnsdall No. 10 F. Foster, 4,025-4,175 feet, 986 bbls. Cities Service No. 5-C Cummins, 4,198-4,258 feet, 520 bbls. Mid-Continent No. 3 Slator, 4,240-4,275 feet, 385 bbls. Atlantic No. 5-C Rumsey, 4,190-4,294 feet, 385 bbls. Devonian No. 1-F Scharbauer, 4,163-98 feet, 287 bbls. Gulf Oil Corp. No. 95 Goldsmith, 4,130-90 feet, 1,672 bbls.; No. 97 Goldsmith, 4,140-4,260 feet, 1,604 bbls. Humble Oil & Refining Co. No. 7-B Cowden, 4,172-4,200 feet, 784 bbls. Gulf Oil Corp. No. 98 Goldsmith, 3,950-4,340 feet, 2,755 bbls. L. H. Wentz No. 3-A TXL, 4,075-4,193 feet, 2,190 bbls. Wentz No. 7-D Parker, 4,040-4,220 feet, 2,975 bbls. Shell Petroleum Corp. No. 14-B E. F. Cowden, 4,040-4,212 feet, 986 bbls. Mid-Continent No. 8 E. F. Cowden, 4,034-4,170 feet, 1,037 bbls. Continental No. 4 Holt, 4,140-4,289 feet, 127 bbls. Stanolind Oil & Gas Co. No. 70 J. M. Cowden, 4,125-4,347 feet, 839 bbls.

Upton County

Acme Oil No. 2-B Shirley, 2,155-2,217 feet, 325 bbls. British American No. 1 Robins, 2,252-79 feet, 450 bbls.

Ward County

Patillo No. 1 Republic-Blair, 2,123-2,395 feet, 18 bbls. Humble Oil & Refining Co. No. 5 Richter, 2,898-2,919 feet, 208 bbls. West Texas Oil & Royalty Co. No. 3-C University, 2,455-2,680 feet, 2,394 bbls. Gulf Oil Corp. No. 90 Estes, 2,580-2,940 feet, 663 bbls. Magnolia Petroleum Co. No. 3-46 Sealey, 2,738-2,858 feet, 447 bbls. Texas Pacific Coal & Oil Co. No. 15 Barker, 2,329-2,408 feet, 308 bbls.

Winkler County

Stanolind-Westbrook No. 4 Ida Hendrick, 3,005-12 feet, 1,100 bbls.; No. 8 Ida Hendrick, 2,915-3,087 feet, 54 bbls. Magnolia Petroleum Co. No. 139 Walton, 2,966-3,671 feet, 379 bbls.; No. 146 Walton, 3,123-70 feet, 758 bbls. Sinclair Prairie No. 8-B F. S. Vaden, 2,940-3,050 feet, 603 bbls. Texas Pacific Coal & Oil Co. No. 3 S. Vaden, 2,964-3,040 feet, 520 bbls. Magnolia Petroleum Co. No. 150 Walton, 2,831-2,955 feet, 1,813 bbls.; No. 152 Walton, 2,839-2,948 feet, 1,153 bbls.; No. 1 Scarborough, 2,980-3,095 feet, 85 bbls.; No. 151 Walton, 2,840-2,940 feet, 532 bbls.

Yoakum County

J. W. Murchison No. 1 W. Fairman, 4,692-5,072 feet, 210 bbls. Eastland Oil No. 1 Candler, 4,935-5,075 feet, 449 bbls. Denver Producing & Refining Co. No. 8 Whittenburg, 4,670-5,042 feet, 803 bbls. Humble Oil & Refining Co. No. 1 Lynn, 4,902-5,100 feet, 348 bbls. Shell Petroleum Corp. No. 1 Roberts, 4,702-5,100 feet, 566 bbls.

Ohio Completions

FINDLAY, Ohio, May 23.—In Central Ohio, a Tuscarawas County well tops the completions. In Lawrence Township, section 17, Brendel Producing Co. No. 2 Robinson Clay Products Co., about 1,200 feet west of its 8,000,000-foot gas well, is good for 4,000,000 feet of gas from the Clinton sand at 4,719 feet.

In Guernsey County, Cambridge Township, Hayes Ferguson No. 2 Morton Campbell Estate is a small gas well from Berea sand at 1,122-29 feet. In Washington Township, Ohio Fuel Gas Co. No. 1 J. H. Harding, section 12, was drilled to 1,499 feet and abandoned.

In Knox County, Union Township, Clairmont Oil & Gas Co. No. 1 Virginia Wander, section 4, in the village of Danville,, is a gas well gauging 890,000 feet from Clinton sand at 2,760-85 feet.

In Licking County, Mary Ann Township, Ridgeway and others No. 1 C. A. Richards, Lot 5, fourth quarter, is a combination well in Berea sand at 780-94 feet, making 100,000 feet of gas and 12 bbls. of oil the first day after shot. In Mary Ann Township, Armbruster No. 1 E. H. Davis, Lot 7, fourth quarter, is a Berea gas well making 150,000 feet at 1,636-45 feet.

In Monroe County, Sunsbury Township, Sunsbury Oil & Gas Co. No. 1 L. Bilyeu, section 9, found the Injun sand dry at 1,545 feet. Total depth was 1,590 feet. In Wayne Township, L. E. Smith No. 1 on fee property is a small gas well in the Berea sand at 1,955-61 feet.

Lima Field

In the Lima area, a new test has been started in Wyandot County after months of inactivity. In Crane Township, William Foss No. 1 L. Benner, is drilling at 700 feet.

Two Green sand tests in Liberty Township, Seneca County, are pushing downward. A. J. West No. 3 A. M. Clouse, section 7, is drilling at about 575 feet. The Sun Oil Co. No. 1 Mary Crum, section 7, is down around 300 feet.

PERSONAL

W. S. FITZPATRICK retired from the board of the Consolidated Oil Corporation at the annual meeting last week, resigning because of ill health. He joined Consolidated in 1932 when it acquired the Prairie Oil & Gas Company, of which he was chief executive officer.

H. J. CRAWFORD was reelected president of the Quaker State Oil Refining Corporation at the annual meeting in Oil City, Pa. Others reelected were S. MESSER and JAMES D. BERRY, vice presidents; W. R. REITZ, secretary and assistant treasurer; CHARLES D. BERRY, treasurer and assistant secretary. The officers and the following comprise the board of directors: W. K. BAYER, J. P. FLYNN, T. B. GREGORY, G. B. HUNTER, H. H. LOWRIE, J. M. KOCH, and E. P. THEOBALD.

J. B. AUG. KESSLER, joint managing director of the Royal Dutch Company, will arrive in the United States from The Hague, Netherlands, soon on a business visit.

HARVEY C. FREMING, president of the International Oil Field and Refinery Workers Union and a member of the advisory council of the Social Security Board, addressed stockholders of the Consolidated Oil Corporation at their annual meeting in New York last week.

HARRY G. SEIDEL, vice president of the International Association (Petroleum Industry), Ltd., a British organization of the Standard Oil Company of New Jersey, recently saw his daughter, ROSAMOND HARRIS SEIDEL, presented at court in London.

J. V. GAUDET, formerly pressure still superintendent of the Skelly Oil Company's refinery in Eldorado, Kans., has been made superintendent of the Idaho Refining Company's plant in Pocatello, Idaho.

F. E. ECKERT, of Handley & Bird, Bradford, Pa., was chosen chairman of the advisory committee of the eastern district, American Petroleum Institute's division of production, which met recently in Pittsburgh, Pa. CHRISTY PAYNE, JR., Peoples Natural Gas Company, Pittsburgh, was elected 1938-39 chairman of the eastern district of the Institute's division of production. Five vice chairmen were elected: F. A. BENKERT, Peoples Natural Gas Company, Pittsburgh; T. H. MYERS, Carnegie Natural Gas Company, Pittsburgh; D. T. RING, Ohio Fuel Gas Company, Columbus, Ohio; J. J. SCHMIDT, East Ohio Gas Company, Cleveland, Ohio; and O. W. VAN PETTEN, Columbian Carbon Company, Charleston, W. Va. The secretary-treasurer is J. A. THOMPSON, Belmont Quadrangle Drilling Corporation, Bradford, Pa.

DR. F. W. L. TYDEMAN, in charge of the San Francisco offices of the Shell Development Company, has left for Europe to confer with affiliated Shell interests.

W. B. WEEKS, geologist for the Phillips Petroleum Company in El Dorado, Ark., will address the Dallas Geological Society next week on "Stratigraphy of Southern Arkansas in the Light of Deeper Drilling."

WILLIAM KRUNK, superintendent for the Belridge Oil Company in the Belridge field of the San Joaquin Basin, had good luck on a recent trout-fishing trip to the upper reaches of the Kern River near Fairview, Calif.

G. A. BURNS has been appointed manager of the newly created sales office of the Shell Petroleum Corporation in Houston, Tex. The new office will serve Texas and New Mexico, formerly supervised by the company's office in New Orleans, La. Before his promotion, Mr. Burns was assistant manager of operations in St. Louis, Mo.

ROBERT FOX, conciliator for the department of labor, arrived in Toledo, Ohio, last Thursday to assist in settling the strike of 200 members of the Oil Workers International Union at the Pure Oil Company refinery. The company closed the refinery last week after the union set up a picket line.

E. A. ANGOT of Paris, France, head of the Refinery de Berre, largest in France, was in Dallas, Tex., recently conferring with COL. E. O. THOMPSON, of the Texas Railroad Commission, and others in regard to increasing the refinery's purchases of Texas oil. M. Angot is already credited with being the largest foreign buyer of Texas crude.

Do You Remember?

From The Oil and Gas Journal Files

25 YEARS AGO

E. L. Brundrett is elected president of the Natural Gas Association of America and Thomas C. Jones, secretary and treasurer.

A very rare thing in the oil industry is a strike of employes. A Toledo, Ohio, producing and refining company has one on its hands, the employes demanding higher wages.

Robert Watchorn resigns as treasurer and financial manager of the Union Oil Company of California on account of ill health. He remains a director and assistant to the president.

The Southwestern Refinery, J. S. Cosden, president, has acquired 105 acres in West Tulsa and will erect a refining plant with a daily crude capacity of about 6,000 barrels.

20 YEARS AGO

J. Edgar Pew, recently resigned as vice president of the Carter Oil Company, will rejoin the Sun Oil Company on June 1, in charge of its production in Oklahoma, Kansas and Texas.

The Empire Gas & Fuel Company's new office building to be erected in Bartlesville, Okla., will be nine stories in height, which will make it the largest office building in Oklahoma.

The federal government has pounced down upon stock promotion "oil" companies in Oklahoma City. Some of the companies bear such names as Quick Action Oil Company, Oil Derrick Oil Company, War Baby Oil Company, and Teachers and Students Oil Company, etc.

10 YEARS AGO

Guy R. Nicholson, of Empire Gas & Fuel Company, Amarillo, Tex., is elected president of the National Scouts Association.

Magnolia Petroleum Company led all companies in production of oil in Oklahoma in the first quarter of 1928, with Gypsy, Carter, Prairie and Sinclair companies following in the order named.

ATTORNEY GENERAL GASTON L. PORTERIE, of Louisiana, heads the special committee which is considering amendments to the proposed new oil code for that state.

HAROLD SMITH, production superintendent for the Mid-Continent Petroleum Corporation in the West Texas district, has moved his headquarters from Kermit to Midland, Tex.

ARTHUR IDDINGS, manager of the International Petroleum Company at Talara, Peru, sailed from New York last Saturday, accompanied by MRS. IDDINGS, after spending two weeks in this country.

C. R. DODSON, in charge of the Standard Oil Company of California's production technology laboratory in La Habra, Calif., has returned from a trip into the San Joaquin Valley where, with an assistant, JOHN C. YOUNG, he collected samples of crude oil and sand cores from the deep producing and drilling wells near Bakersfield.

C. W. EDWARDS, of Rotan, Tex., has been elected to head the newly formed Fisher County Pipe Line Company, organized to build and operate a 12-mile outlet for the Rotan field in western Texas. L. D. KING, of Abilene, Tex., is the new vice president, and WILLIAM H. WALDROP, also of Abilene, is secretary-treasurer.

RUSSELL BROWN, general counsel of the Independent Petroleum Association of America, spoke before the Bradford District Producers Association in Bradford, Pa., recently. He discussed bills before congress which are of interest to the petroleum industry and told of measures now on the statute books in response to the request of the industry for legislative assistance.

PARAGRAPHS

L. W. BERRY, vice president and field manager of the Anglo-Ecuadorean Oilfields, Ltd., London, arrived in New York last week for a brief visit.

FRANK SPONAR, agent for the Standard Oil Company (Indiana) in Iowa City, Iowa, and LARRY DELANEY, his assistant, have received $100 each from the company in recognition of their bravery in overcoming a bandit who attempted last month to rob the bulk plant in Iowa City. A letter from AMOS BALL, Chicago, general manager of sales, said: "It is not the policy of the company to expect employes to endanger their lives to protect its funds under such circumstances, and we certainly would not encourage others to take the risks you incurred. This does not detract from our admiration of the rare courage you displayed." The two employes were working at the bulk plant when they were forced at the point of a pistol to open the safe. As the bandit was taking the money the two leaped upon him, wrenched the pistol from him and then turned him over to the police.

ARTHUR G. LEVEY has resigned as production manager of the Crown Central Petroleum Corporation in Houston, Tex., and now is associated with Fohs Oil Company, Houston, as chief petroleum engineer.

E. F. BATTSON has been appointed northern sales manager of Continental Oil Company, it is announced by HARRY J. KENNEDY, vice president in charge of marketing. His headquarters will be in Chicago. Mr. Battson joined Continental in 1922 as a clerk in the Salt Lake City, Utah, division office. He will have supervision over the company's marketing activities in Illinois, Indiana, Ohio, Michigan, Wisconsin, Minnesota, Kentucky, Missouri, Kansas, Nebraska, Iowa, North Dakota and South Dakota. He succeeds O. B. "OAK" LLOYD, recently appointed general sales manager.

JOHN D. ROCKEFELLER III, heir to America's biggest oil fortune, is chairman of a committee which, sponsored by the Boys Bureau, has made a comprehensive study of juvenile delinquency and which urges in its report radical changes in methods of handling young wrongdoers. Mr. Rockefeller personally visited prisons and talked not only with wardens and guards, but with great numbers of prisoners between the ages of 16 and 21. He was accompanied by a social worker, who has told of these experiences in a book called "Youth in the Toils." There is no reference to Mr. Rockefeller except to mention him as chairman of the committee. The report says the place to begin reform is not in the penal institution, where there is "an atmosphere of cunning, force, graft, and immorality," but in the delinquent before he reaches the prison.

DANIEL A. BREENE, son of E. C. BREENE, Oil City, Pa., producer, has been appointed Kansas City, Mo., representative of the Pennsylvania Grade Crude Oil Association.

DAN J. MORAN, of Houston, Tex., was reelected president of the Continental Oil Company at a meeting of the directors in New York last week. He has filled the office since April, 1928.

EDMUND JUSSEN, JR., formerly manager of field operations for the Union Oil Company of California, has established his headquarters in the Subway Terminal Building in Los Angeles as a consulting petroleum engineer.

D. W. GRANT was chosen second vice president of the Pennzoil Company at its recent annual meeting in Oil City, Pa. Reelected officers are C. L. SUHR, chairman of the board; W. S. ZEHRUNG, president; M. A. BREWSTER, vice president and treasurer, and R. A. BROWNE, secretary.

DANIEL FISHER has been made superintendent of drilling for the Gold Coast Oil Company of Seattle, Wash. The new concern, backed by FRANK TIERNEY, has started a well in a semiproven area of the Sunset-Midway field near Taft, Calif. The California headquarters of the company will be in Bakersfield.

HOWARD H. GREENE, vice president of the Kendall Refining Company, Bradford, Pa., was chosen to fly the first consignment of air mail from Bradford last Thursday in observance of National Air Mail Week. H. DOUGLAS BROWN, JR., production superintendent of the Brundred Oil Corporation, Oil City, Pa., was one of four pilots chosen for a similar duty in Oil City.

Is Now Vice President

Recent election of R. C. Bowles to the office of vice president of the Standard Oil Company of Kansas was another advancement in a career built around petroleum geology.

R. C. BOWLES

After graduating from the Norman, Okla., high school Mr. Bowles entered the University of Oklahoma. He majored in geology and received his bachelor of science degree in 1924. His introduction into the oil industry took place the next year, when he joined the geological staff of the Carter Oil Company in Ardmore, Okla. In 1926 he left that organization to take a similar position with the Dixie Oil Company in the San Antonio, Tex., district, remaining with that organization two years. In 1928 he became associated with the Producers & Refiners Corporation, whose headquarters were in Denver, Colo. Through his work with that company, which had leases in Oklahoma, Texas and Kansas, he became especially familiar with oil developments in West Texas and Oklahoma. In 1931 Mr. Bowles returned to San Antonio, this time as geologist for the Duval Oil Corporation. In the same year he joined the Standard of Kansas, and he was made head of its geological department.

Mr. Bowles was born in Hunter, Okla., in 1900. He married Miss Mignon Bauman in 1928, and with their one child they reside in Houston, Tex. He is active in the Houston and San Antonio geological societies, and plays golf at the Brae Burn Country Club, Houston.

TOMMY HITCHCOCK, JR., noted American polo player, spent a day in Shreveport, La., last week and visited an oil field where he holds an interest.

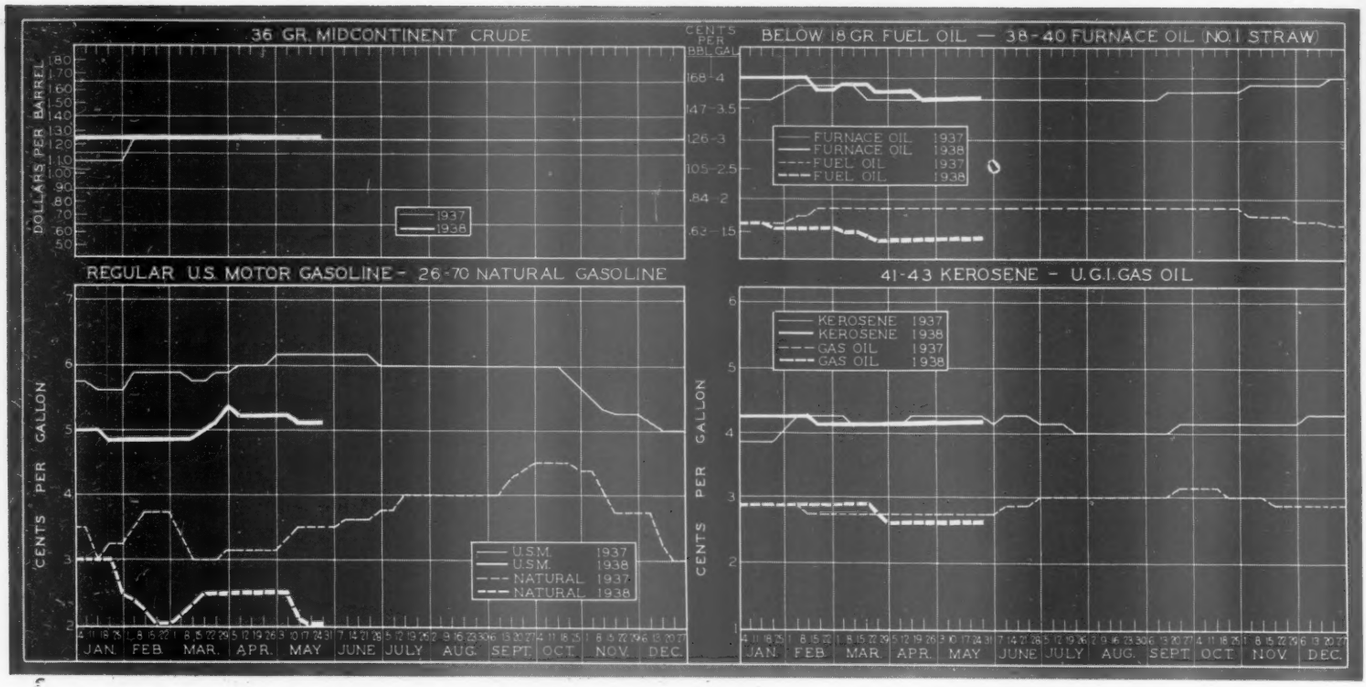
H. B. SPERRY, president of the North American Oil Company Consolidated, of San Francisco, is back from a trip to Louisiana where his company has completed its third large gas well.

C. J. DEAN, petroleum engineer for the General Petroleum Corporation, discussed recent development in the Wilmington field before a meeting of the local chapter of the American Petroleum Institute in Taft, Calif., last Thursday.

CLARENCE FROOME, superintendent of shops and tools for the Union Oil Company of California, and HENRY GRINNELL, superintendent of service and maintenance, have left their Santa Fe Springs, Calif., office for Kansas, where Union is drilling a wildcat.

T. E. BUCHANAN has resigned as president of the Petroleum Navigation Company and the Intracoastal Towing & Transportation Company, Houston, Tex. C. O. IRVINE was chosen to succeed him in both offices. H. W. ANDERSON was chosen vice president of the Petroleum Navigation Company.

F. C. LAURIE, vice president and general manager of the Lago Petroleum Corporation in Maracaibo, Venezuela, has returned to that country after attending the annual meeting of the executives of the Standard Oil Company (New Jersey) and subsidiary companies. G. M. KNEBEL, general manager for Lago in Carapito, Venezuela, sailed back also. He was accompanied by MISS ELIZABETH ANN KNEBEL.



Representative Mid-Continent Quotations on Crude Oil and Refined Products, Basis Oklahoma (Group 3)

Gasoline Is Firmer in Group 3 Market as Jobbers Buy for Memorial Day

By T. F. SMILEY

Further strengthening of gasoline, with tightening of quotations, was observable in the Group 3 area this week, and buying for Memorial Day was lending to the market an element of solidity which had been wanting. Sales managers reported they were marking up certain grades on which they were sold out, and the whole list looked better.

Falling on Monday this year, Memorial Day converts the week-end into a triple holiday. Always an occasion for stocking up, it is expected to impart more than the usual fillip to the market and quite definitely to mark the opening of the heavy consuming season.

Stocks in Better Shape

Conditions generally contributed to rising optimism. Total gasoline stocks were being pulled down from the astronomical heights they had reached. Crude production was being curtailed and stocks were falling, with indications that before the first of June they at least would be no higher than they were in the corresponding period of 1937. Bureau of Mines figures show that gasoline stocks in the Oklahoma-Kansas-Missouri territory are now about 13½ per cent lower than they were a year ago. Stocks in Illinois, Indiana, and Kentucky are not far from last year's figures. Taking the inland area as a whole, stocks are 1¾ per cent lower than they were a year ago, and they are working into a better position. Inventories on the Texas Gulf Coast have dropped almost 12 per cent below their peak of last February, but they still are 15½ per cent higher than they were a year ago. If gasoline demand increases 3 per cent above that of 1937 and if stocks continue to move toward a better economic level (both contingencies seem probable), refiners see no reason why tankcar prices should not start going up soon.

Talk of further cuts in crude prices has subsided. The drop in gasoline stocks, with its bracing effect on the tankcar market, is attributable in a substantial degree to the reduction in crude output, since some refiners, with scant crude supplies, find themselves forced to lower their runs to stills, and are drawing gasoline from storage.

A faintly improved tone characterized natural gasoline, although manufacturers said reduction in the price of the 26-70 grade to 2 cents had failed to move material to the extent that had been expected. It had spurred jobber buying only a little, but enough, it was believed, to clear up distress stocks pretty well. New buying, such as it is, was said to come mainly from refiners, rather than from jobbers, and most of it was from the Gulf Coast, where occasional cargoes of finished gasoline are being moved. Increasing consumption of motor fuel is helping the naturals a little too, though assistance from that quarter is of necessity limited, since summer blends call for a smaller proportion of natural gasoline. At current prices, however, the refiner who can use this material is buying it.

Heating Oils Slighty Steadier

Heating oils were a wee bit steadier as the first signs of interest in buying for fall storage appeared. Inquiries received by sales managers for No. 2 gas oil, of 32-36 gravity, straw or amber color, uncovered little of the material seeking outlets. No changes were noted in quotations, which now are about where they were throughout last summer. It was believed the price pattern set in 1937 was likely to be followed this year, and that while the decline in lower-gravity fuels probably had reached bottom, no upturn of consequence was likely to be witnessed till August or September, when buying for winter use should attain substantial volume.

Movement of tractor fuel and its associated products—kerosene, range oil, and prime-white distillate—was satisfactory and with the harvest season near, continuation of brisk demand seemed assured. Lubricants were sluggish.

Refined Oil Market Barometer

Improvement in crude situation has imparted a better feeling in the refined market, especially noticeable in gasoline. Notwithstanding unfavorable motoring weather in some areas, jobber buying is in rising volume and higher tankcar prices are in sight. Substantial drop in Mid-Continent gasoline stocks encourages refiners. Opening of harvest season should help tractor fuels.

MID-CONTINENT. Gasoline improving. Naturals weak. Heating oils slightly steadier.

EAST COAST. Gasoline firmer in spite of rainy weather. Industrial oils sluggish.

GULF COAST. General market dull, with no changes of consequence in prices.

CALIFORNIA. Fuel oil, diesel, and gas oil soft. Gasoline weak. Market dull.

PENNSYLVANIA. Gasoline shows improvement. Neutrals down. Bright stocks steady.

CHICAGO. Gasoline more active. Interest in heating oils for storage appearing.

Temporary Setback by Weather in East but Buyers Confident

By H. STANLEY NORMAN

NEW YORK, May 24.—Rains and cooler weather put a damper on direct consumption of motor fuel last week, but dealers and jobbers, realizing that it was only a temporary setback, bought in the open market and ordered against contracts without abatement. The unfavorable driving weather tended to stack up gasoline at the weakest point in the marketing chain—the retail outlets. The wide spread existing between tank-wagon and service station prices together with the "dumping" of a sizeable quantity of motor fuel two weeks ago in the Bronx led to disturbed retail conditions in New York.

Six gallons of low octane, unbranded motor fuel were obtainable in parts of the Bronx and Queens at 98 cents, exclusive of the New York City 2 per cent sales tax. There were only a few stations in Brooklyn and Manhattan attempting to meet the lower retail prices in the Bronx. Few thought the cuts might spread beyond their present limits. In the early part of May one large quantity of 65 octane motor fuel was delivered in barges to Bronx and Queens dealers at 5¾ cents, about three-eighths of a cent per gallon under the prevailing market. This gasoline is doubtless figuring in the weakened retail market and when it is absorbed conditions are expected to return to normal.

In general, however, the East Coast motor fuel market is stronger now than at the start of the month. Since the one trade early in the month at 5¾ cents per gallon in barges, the tankcar and barge market for motor fuel has stiffened considerably. There are no fresh reports of under the market trading and sentiment in the trade inclines to higher prices in the near future.

The rate of consumption along the East Coast territory is reflected on the Gulf Coast where suppliers of high octane motor fuel particularly have moved their quotations up slightly. Prices most frequently quoted on the Gulf Coast range from 5⅜ to 5½ cents per gallon for high octane gasoline.

A cargo of export gasoline consisting of about 80,000 bbls. of 65 octane, 400 endpoint material was sold recently for 4⅞ cents per gallon. Existence of other inquiries in the Gulf Coast market for export motor fuel caused most suppliers to quote from 5 to 5¼ cents per gallon on future business. Most of the available gasoline has been moved from Rumania and Gulf Coast plants are about the only remaining source of open market material for the European trade. Coastwise movement against contracts is approaching mid-summer proportions. With crude production curtailed and several refineries shut down suppliers are not too anxious to sell at present levels which are only slightly improved over absolute lows of the winter business.

Although much remains to be done in liquidating gasoline stocks, reductions in the past two or three weeks have been satisfactory and if continued through the end of May the June 1 total will be in better position than anticipated by some.

At least one company, Standard Oil Co. (N. J.) has announced intention of dictating the retail price at which its products must be resold in New Jersey under provisions of the state's new fair trade law. Whether other major and independent companies will resort to the fair trade law in elevating New Jersey gasoline prices to a par with neighboring states remains undetermined. Some have said they are giving consideration to the question and others report their action will be guided by future developments. Retail conditions in New Jersey, particularly the northern part of the state, have been subject to more frequent and violent disturbance than in any other part of the country. Accessibility of the market by water has made New Jersey particularly attractive to dealers and companies alike, resulting in a concentration of marketing effort without parallel.

Dullness in the fuel oils continues with little indication of a change in the near future. Industrial oils are moving in the New York tankcar market for as little as 2¾ cents per gallon and the top prices are barely over 3 cents. A cargo of No. 2 fuel oil for coastwise movement sold on the Gulf Coast last week for 3¼ cents and tank-wagon prices in New Jersey were marked down a quarter of a cent by Standard Oil Co. (N. J.) May 13. Delaware, Maryland and the District of Columbia received a half cent reduction on No. 2 and No. 4 fuel oil. Demand for kerosene is no more than fair and material is selling in the New York tankcar market at 5½ cents per gallon. Deliveries by barge can be obtained for 5¼ cents and it is believed this price is being offered to some tankcar consumers. The tank-wagon price for kerosene in New Jersey is currently quoted by Standard at 8 cents per gallon and at 7¾ cents in Washington.

Pennsylvania neutral prices were generally lowered a half to a full cent per gallon last week bringing the 25 pour-test grades down to 14 cents per gallon. Shipments against contracts and on inter-refinery sales are reasonably satisfactory, but spot market demand is lagging considerably behind comparable seasons in recent years. Bright stocks are fairly steady and dark cylinder oils are unchanged from the preceding week both in demand, which is said to be satisfactory, and in prices. Pennsylvania refiners have generally elevated their quotations on U. S. Motor gasoline to around 5⅛ to 5¼ cents per gallon with demand in fair balance with production.

Standard Oil Co. of Ohio reduced tank-wagon gasoline prices an eighth of a cent per gallon throughout its territory the middle of last week.

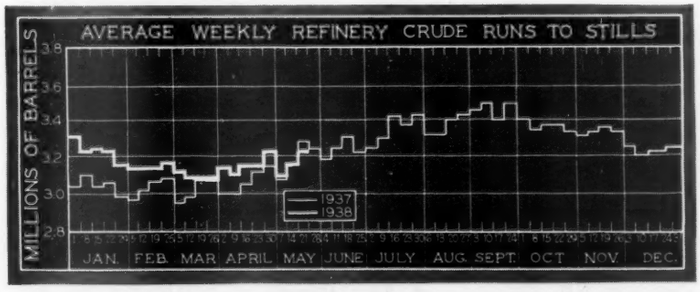
Bunker C fuel oil is unchanged in north Atlantic terminals where $1.05 per barrel is the quotation most frequently heard. This type of fuel oil is reported soft on the Gulf Coast despite a large purchase by one company during the latter part of April. Export demand for heavy oil has been at an increased rate since Mexican supplies were cut off from world trade but even this has proven insufficient to offset the loss in domestic consumption occasioned by curtailed factory, power plant and railroad requirements.

A. P. I. Weekly Refinery Statistics

Week Ending May 21, 1938

	Capacity reporting (per cent)	Daily crude runs (bbls.)	Total gasoline stocks	Gas oil and fuel oil stocks
East Coast	100.0	470,000	22,946,000	10,710,000
Appalachian	88.4	108,000	3,346,000	1,374,000
Indiana, Illinois, and Kentucky	92.4	420,000	14,384,000	8,029,000
Oklahoma, Kansas, and Missouri	84.7	288,000	7,783,000	3,861,000
Inland Texas	56.6	144,000	2,616,000	1,674,000
Texas Gulf	95.7	773,000	12,240,000	9,157,000
Louisiana Gulf	96.6	139,000	2,377,000	3,487,000
North Louisiana and Arkansas	63.7	47,000	510,000	748,000
Rocky Mountains	69.7	45,000	2,224,000	810,000
California	90.9	517,000	14,896,000	89,583,000
Total reported	89.0	2,951,000	83,322,000	129,433,000
Estimated unreported	.....	274,000	4,670,000	2,680,000
*Estimated total	.....	3,225,000	87,992,000	132,113,000
*Estimated total, previous week	.....	3,170,000	88,647,000	130,250,000
*May 22, 1937	.....	3,290,000	79,827,000	95,111,000

*Bureau of Mines, currently estimated.



Stocks of Crude Oil in the United States

(BUREAU OF MINES ESTIMATES)

Week ending May 14, 1938	304,198,000 barrels
Week ending May 7, 1938	305,748,000 barrels
Week ending May 15, 1937	306,119,000 barrels

Retail Oil Markets

Tank-wagon and filling station prices on gasoline and kerosene furnished by the larger marketing firms

Prices as of May 24, 1938

Taxes

The gasoline quotations given in the following tables include the 1-cent federal tax, as well as state, county and city taxes. The gasoline is the regular or standard grade. In most areas a third grade and a premium grade are also available.

Standard Oil Co. (Indiana)

	Gasoline			Kero.
	Tank wag.	Dlr.	Inc. tax	tank-wag.
Chicago, Ill.	15.6	13.6	4.0	10.5
Decatur	15.6	14.1	4.0	10.5
Joliet	15.6	14.1	4.0	10.5
Peoria	15.6	14.1	4.0	10.5
Quincy	15.4	13.9	4.0	10.3
Davenport, Ia.	15.6	14.1	4.0	‡10.5
Des Moines	15.4	13.9	4.0	‡8.3
Mason City	15.8	14.3	4.0	‡10.7
Sioux City	15.6	14.1	4.0	‡10.5
Duluth, Minn.	17.4	15.9	5.0	11.3
Mankato	17.0	15.5	5.0	10.9
Minneapolis	17.0	15.5	5.0	10.9
LaCrosse, Wis.	17.0	15.5	5.0	10.9
Green Bay	17.4	15.9	5.0	10.3
Milwaukee	16.8	15.3	5.0	10.7
Detroit, Mich.	15.3	13.8	4.0	10.0
Grand Rapids	14.8	13.8	4.0	9.7
Saginaw	16.3	14.8	4.0	9.3
Evansville, Ind.	17.1	15.6	5.0	†11.0
Indianapolis	17.3	15.8	5.0	†11.2
South Bend	17.6	16.1	5.0	†9.4
Fargo, N. Dak.	17.2	15.7	4.0	12.1
Minot	18.5	17.0	4.0	13.4
Huron, S. Dak.	17.5	16.0	5.0	11.4
Kans. City, Mo.*	14.9	13.4	4.0	9.8
St. Louis*	15.2	13.7	4.0	8.0
St. Joseph*	14.9	13.4	4.0	9.8
Wichita, Kans.	14.4	12.0	4.0	8.3

*State tax 2 cents, 1-cent city tax and 1-cent federal tax. †Does not include 4-cent state tax. ‡Does not include 3-cent state tax.

Exclusive of state general sales taxes.

Discounts to commercial consumers: On purchases per month off tank-wagon prices: 1,000 gallons or more, 1.5 cents off; minimum delivery 25 gallons.

Stanolex Fuel Oil in Chicago

Effective Dec. 7, 1936, f.o.b. Chicago tank-wagon prices: Range oil, 1-99 gallons, 8.8 cents; 100-149 gallons, 7.8 cents; 150 gallons and over, 7.3 cents. Stanolex No. 1, 1-99 gallons, 8.8 cents; 100-149 gallons, 7.8 cents; 150 gallons and over, 7 cents. Stanolex furnace oil, 1-149 gallons, 7.8 cents; 150 gallons and over 7 cents; Stanolex A, 1-399 gallons, 5.75 cents; 400 gallons and over, 4.75 cents. Stanolex B, 1-799 gallons, 5.75 cents; 800 gallons and over, 4.75 cents.

Atlantic Coast District

STANDARD OIL CO. OF NEW JERSEY

	Gasoline			Kero.
	Tank-wag. dlr.	Tank-car con'r.	Inc. tax	tank-wag.
Atl'tic. City, N. J.	12.75	11.25	4.0	8.0
Newark	12.75	11.25	4.0	8.0
Annapolis, Md.	14.85	13.35	5.0	9.5
Baltimore	14.25	12.75	5.0	9.0
Cumberland	16.65	14.15	5.0	10.6
Wash'g'n, D. C.	12.5	11.0	3.0	9.5
Danville, Va.	16.95	14.45	6.0	12.9
Norfolk	15.75	13.25	6.0	11.5
Petersburg	16.05	13.55	6.0	11.7
Richmond	16.05	13.55	6.0	11.7
Roanoke	17.25	14.75	6.0	12.9
Charles'n, W. V.	17.05	14.55	6.0	12.6
Parkersburg	15.35	13.85	6.0	11.2
Wheeling	16.25	14.85	6.0	12.2
Charlotte, N. C.	18.65	16.15	7.0	12.6
Hickory	19.15	16.65	7.0	13.0
Mt. Airy	18.95	16.45	7.0	12.8
Raleigh	18.25	15.75	7.0	12.1
Salisbury	18.75	16.25	7.0	12.7
Charleston, S. C.	17.25	14.75	7.0	11.1
Columbia	18.25	15.75	7.0	12.1
Spartanburg	18.95	16.45	7.0	12.9

Price basis to commercial consumers, effective March 8, 1937, in Maryland, District of Columbia, and in Arlington and Fairfax counties in Virginia; and March 12 in New Jersey: To contract accounts purchasing at least one full compartment at time by hose connection, on yearly purchases: From 2,500 to 100,000 gallons, consumer tank-wagon price at time and place of delivery; 100,000 gallons per year, consumer tankcar price plus .5 cent per gallon. Consumer tank-wagon price generally will be equivalent to dealer tank-wagon price less .5 cent per gallon.

Effective May 15, 1937, in North and South Carolina, West Virginia and Virginia (except Arlington and Fairfax counties): Commercial consumers taking deliveries of 50 gallons (W. Va., 100 gallons) or more at one time will be billed at posted consumer tank-wagon price. Accounts taking deliveries of less than 50 gallons (W. Va., 100 gallons) will be billed at 4 cents per gallon over posted consumer tank-wagon price. Generally the posted consumer tank-wagon price will be the equivalent to the dealer price less .5 cent per gallon.

Discount for kerosene, 1 cent off tank-wagon price for 25 gallons or more under contract (contract not necessary in Baltimore) except no discount in New Jersey.

Southern District

STANDARD OIL CO. OF KENTUCKY

	Gasoline			Kero.
	Tank-wag.	Net dlr.	Inc. tax	tank-wag.
Atlanta, Ga.	20.0	17.0	7.0	12.0
Augusta	21.0	18.0	7.0	*14.0
Macon	21.0	18.0	7.0	*14.0
Savannah	19.5	16.5	7.0	*12.0
Birm'ham, Ala.	21.0	18.0	8.0	12.0
Mobile	21.0	18.0	9.0	11.0
Montgomery	21.0	19.0	9.0	13.0
Jackson, Miss.	19.5	16.5	7.0	*12.5
Vicksburg	19.5	16.5	7.0	*12.5
Jacks'ville, Fa.	22.5	17.5	8.0	11.0
Miami	20.5	17.5	8.0	11.0
Pensacola	22.0	19.0	9.0	12.0
Tampa	19.5	16.5	8.0	10.5
Lexington, Ky.	19.0	16.0	6.0	11.0
Covington	18.5	15.5	6.0	11.0
Louisville	19.0	16.0	6.0	10.5
Paducah	19.0	16.0	6.0	10.0

Price basis to tank-wagon consumers: Effective January 4, 1937, 3 cents per gallon below tank-wagon price. Kerosene prices in all states subject to 2 cents discount except in Kentucky where prices are net.

*Includes 1-cent state tax.

Montgomery, Ala., has a county tax of 1 cent per gallon, and a city tax of 1 cent per gallon on gasoline, in addition to state tax; and 1 cent per gallon on kerosene. Mobile, Ala., has a city gasoline tax of 2 cents per gallon; Birmingham, Ala., has a city gasoline tax of 1 cent per gallon; Pensacola has a city gasoline tax of 1 cent.

Rocky Mountain District

CONTINENTAL OIL CO.

	Gasoline		Kero.
	Dealer	Inc. tax	tank-wag.
Denver, Colo.	14.0	5.0	11.5
Grand Junction	19.0	5.0	15.0
Pueblo	13.0	5.0	10.5
Casper, Wyo.	17.0	5.0	11.5
Cheyenne	13.0	5.0	13.0
Butte, Mont.	19.5	6.0	15.5
Billings	19.5	6.0	13.0
Helena	19.5	6.0	15.5
Great Falls	19.5	6.0	15.5
Salt Lake City, Utah	18.0	5.0	16.0
Twin Falls, Ida.	21.0	6.0	18.0
Boise	21.5	6.0	18.0
Albuquerque, N. M.	17.5	*6.5	12.0

*Includes city tax of one-half cent.

Ohio

STANDARD OIL CO. OF OHIO

	Gasoline			Kero.
	Tank-wag. con'r.	Dlvided dlr.	Inc. tax	tank-wag.
Ohio points	16.5	15.5	5.0	*13.0

*Includes state tax of 1 cent.

New York and New England

SOCONY-VACUUM OIL CO., INC.

	Gasoline			Kero.
	Tank-wag.	Tank-car	Inc. tax	tank wag.
Albany, N. Y.	14.5	12.5	5.0	9.0
*Met. N. Y.:				
M'htt'n, Br'nx	14.0	12.5	5.0	8.75
Staten Island	14.0	12.5	5.0	8.75
Q'ns & Bklyn.	14.0	12.5	5.0	8.75
Buffalo	14.0	13.0	5.0	7.5
Rochester	15.0	13.2	5.0	8.5
Syracuse	14.5	13.1	5.0	9.0
Boston, Mass.	13.5	11.75	4.0	8.5
Portland, Me.	15.0	13.0	5.0	8.75
Manch'ter, N.H.	15.5		5.0	9.0
Burlington, Vt.	15.4	13.4	5.0	9.5

*Does not include 2 per cent city sales tax which is calculated on basis of net retail price exclusive of state and federal taxes. Metropolitan New York prices are undivided dealer prices; others are split dealer.

Price basis to undivided dealer: Posted dealer tank-wagon price less .5 cent.

Price basis to commercial consumer: Effective Nov. 15, 1936, monthly purchases of 25,000 gallons and over, consumer tankcar prices at delivery point plus .5 cent per gallon; monthly purchases of 5,000 to 25,000 gallons, undivided dealer price at delivery point; monthly purchases under 5,000 gallons, pay divided dealer tank-wagon prices at delivery point.

Pacific Coast Territory

STANDARD OIL CO. OF CALIFORNIA

	Gasoline			Kero.
	Tank-wag.	Serv. sta.	Inc. tax	tank-wag.
San Francisco	17.5	18.5	4.0	11.5
Los Angeles	17.0	18.0	4.0	10.0
Fresno, Calif.	18.5	19.5	4.0	12.5
Phoenix, Ariz.	21.5	22.5	6.0	*17.5
Reno, Nev.	20.5	21.5	5.0	13.5
Portland, Ore.	20.0	21.0	6.0	13.5
Seattle, Wash.	20.0	21.0	6.0	13.5
Spokane	23.0	24.0	6.0	16.5
Tacoma	20.0	21.0	6.0	13.5

*Includes 5-cent state tax.

Discounts to dealers: On gasoline, off tank-wagon price, to 100 per cent dealers, 3 cents; to split dealers, 2 cents. To commercial consumers: on tank-wagon price: on single deliveries of 40 gallons and over, advance quantity discount extended at time of delivery, 3 cents. Service station schedule applies on single deliveries less than 40 gallons. On kerosene in tankcar, transport truck and trailer delivery, 3 cents off tank-wagon price; plant deliveries to jobbers, 2.5 cents below tank-wagon.

Nebraska

STANDARD OIL CO. OF NEBRASKA

	Gasoline			Kero.
	Tank wag.	Dlr.	Inc. tax	tank-wag.
Omaha	18.0	16.5	6.0	10.8
McCook	17.5	15.0	6.0	9.5
Norfolk	18.4	16.9	6.0	10.3
North Platte	18.8	16.9	6.0	11.0
Scotts Bluff	19.5	16.5	6.0	12.3

Discounts to commercial consumers for tank-wagon deliveries covered only by standard commercial consumers contract, effective Jan. 1, 1935.

Central South District

STANDARD OIL CO. OF LOUISIANA

	Gasoline			Kero.
	Tank-wag. dlr.	Tank-car con'r.	Inc. tax	tank-wag.
N. Orleans, La.	19.0	16.5	*10.0	†12.0
Baton Rouge	17.0	14.5	8.0	12.0
Alexandria	17.5	15.0	8.0	10.5
Lafayette	18.0	15.5	8.0	12.5
Lake Charles	18.0	15.5	8.0	12.5
Shreveport	16.5	14.0	8.0	9.5
Kn'xv'lle, Tenn.	20.0	17.5	8.0	14.0
Memphis	18.0	15.5	8.0	12.0
Chattanooga	19.5	17.0	8.0	13.5
Nashville	19.0	16.5	8.0	10.5
Bristol	19.0	17.75	8.0	14.5

*Includes 2-cent parish tax. †Includes 1-cent parish tax and 1-cent state tax.

Price basis to commercial consumers: Effective May 15, 1937, deliveries of 50 gallons or more in one delivery takes posted consumer tank-wagon price. Accounts taking deliveries of less than 50 gallons at one time pay posted consumer tank-wagon price plus 4 cents per gallon. Generally, the posted consumer tank-wagon price will be equivalent to the dealer price less .5 cent per gallon.

Louisiana kerosene prices include 1-cent state tax.

Pennsylvania, Delaware and Part of New England

ATLANTIC REFINING CO.

	Gasoline			Kero.
	Tank-wag. dlr.	Tank-car con'r.	Inc. tax	tank-wag.
Philadelphia, Pa.	13.75	12.25	5.0	10.0
Pittsburgh	15.0	13.0	5.0	10.5
Allentown	14.25	12.75	5.0	10.5
Erie	14.5	13.0	5.0	10.0
Scranton	14.5	13.0	5.0	10.5
Altoona	15.0	13.0	5.0	10.5
Dover, Del.	13.5	....	5.0	10.5
Wilmington	13.5	....	5.0	10.5
Springf'd, Mass.	13.5	....	4.0	8.0
Worcester	14.0	....	4.0	8.5
Hartford, Conn.	13.6	....	4.0	7.5
New Haven	13.5	....	4.0	8.0
Providence, R. I.	13.0	....	4.0	8.0

Price basis to undivided dealers, dealer tank-wagon price less .5 cent per gallon. Price basis to commercial consumers in Pennsylvania and Delaware, effective March 11, 1937: Consumers under contract using 100,000 gallons or more per year full compartment hose deliveries, tankcar plus .5 cent. Consumers under contract using less than 100,000 gallons per year compartment hose deliveries, undivided dealer price. Consumers under contract less than full compartment delivery, consumers not under contract, less than full compartment delivery, and consumers not under contract full compartment delivery, divided dealer price. Less than 25 gallons, tank-wagon delivery, 4 cents per gallon above undivided dealer price.

Oklahoma and Arkansas

CONTINENTAL OIL CO.

	Gasoline		Kero.
	Dealer	Inc. tax	tank-wag.
Muskogee, Okla.	14.5	5.0	7.0
Oklahoma City	13.5	5.0	8.0
Tulsa	14.0	5.0	6.0
Ft. Smith, Ark.	14.25	5.0	8.0
Little Rock	16.75	7.5	9.5
Texarkana	14.0	5.0	8.5

Texas

	Gasoline			Kero.
	Tank-wag.	Serv. sta.	Inc. tax	tank-wag.
Dallas, Tex.	14.0	18.0	5.0	8.0
Fort Worth	14.0	18.0	5.0	8.0
Houston	14.5	19.0	5.0	8.0
San Antonio	13.5	17.5	5.0	8.0

Naphtha

STANDARD OIL CO. (INDIANA)

	Tank-wagon*
Oleum spirits	15.7
V.M.&P. naphtha	16.0
Cleaners' naphtha	15.0
Stanisol	15.0

*Prices include 3-cent Illinois tax, but not 1-cent federal tax or 2 per cent retail occupational tax.

Prices f.o.b. Chicago. Each price subject to discount of 1 cent per gallon for 150-gallon lots if covered by contract.

Canada*

3-Star Imperial Gasoline
IMPERIAL OIL, LTD.

	Tank-wag.	Inc. tax	Kero. tank-wag.
Halifax, N. S.	24.5	10.0	18.5
St. John, N. B.	24.5	10.0	18.5
Montreal, Que.	21.0	6.0	17.5
Toronto, Ont.	22.0	6.0	17.0
Hamilton, Ont.	22.0	6.0	17.0
Winnipeg, Man.	27.5	7.0	20.7
Brandon, Man.	28.1	7.0	22.3
Regina, Sask.	27.0	7.0	22.0
Saskatoon, Sask.	29.8	7.0	24.9
Edmonton, Alta.	26.5	7.0	21.5
Calgary, Alta.	24.0	7.0	19.0
Vancouver, B. C.	23.0	7.0	23.0

*Imperial gallon used in Canada.

Divided dealers pay tank-wagon price. Discount to undivided dealers, 1 cent below tank-wagon price. In maritime provinces both divided and undivided dealers pay tank-wagon price.

Retail Price Changes

Standard Oil Co. of Kentucky May 9 reduced tank-wagon and dealer gasoline 1 cent at Atlanta; May 16 reduced tank-wagon kerosene 2 cents at Atlanta; May 13 reduced tank-wagon and dealer gasoline 1 cent at Tampa.

Continental Oil Co. May 13 reduced dealer gasoline 3 cents at Cheyenne.

Standard Oil Co. May 12 reduced tank-wagon kerosene .2 cent at North Platte.

Oil Company Gives Motorists Decoration Day Warning

"Leave Speeding to Race Drivers Decoration Day!" is the plea to more than 14,000,000 motorists to drive safely Decoration Day week-end to be made by Standard Oil Co. of Indiana, which in hundreds of advertisements in newspapers will suggest:

"Take a tip from the speed kings this Decoration Day. . . . Put your car in shape before you start. . . . But leave the speeding to the race drivers!"

It will warn that "Service your car before you start!" is not only a "must" with a race driver, but also a good rule for the average automobile driver when he goes on a trip.

Prices of Refined Products

All quotations f.o.b. plant in cars for interstate or export movement except as otherwise noted

Prices as of May 24, 1938

The following quotations are exclusive of the federal excise taxes of 1 cent a gallon on gasoline and 4 cents on lubricating oils.

Refinery Gasoline

OKLAHOMA (Group 3)—

U. S. Motor grades:		
62 oct. and below		.04¼
63-66 octane	.04½	.04⅝
67-69 octane	.04¾	.04⅞
70-72 octane (regular)	.05⅛	.05¼
60-62 400 grades:		
62 oct. and below		.04¼
63-66 octane	.04½	.04⅝
67-69 octane	.04¾	.04⅞
70-72 octane (regular)	.05⅛	.05¼
64-66 375	.04¾	.04⅞
68-70 360	.05	.05⅛

NORTH TEXAS—

U. S. Motor grades:		
62 octane and below		.04¼
63-66 octane	.04½	.04⅝
67-69 octane	.04¾	.04⅞
70-72 octane (regular)	.05⅛	.05¼
60-62 400		.04¼
64-66 375	.04¾	.04⅞

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

U. S. Motor grades:		
62 octane and below		.04½
63-66 octane	.04⅞	.05
67-69 octane	.05	.05⅛
70-72 octane (regular)	.05½	.05⅝

ARKANSAS (Ark., N. La., Miss. del.)—

U. S. Motor grades:		
62 octane and below	.04½	.04⅝
67-69 octane	.05	.05⅛
70-72 octane (regular)	.05½	.05⅝

CHICAGO (Based on Group 3)—

U. S. Motor grades:		
62 octane and below	.04¼	.04⅜
63-66 octane	.04½	.04¾
67-69 octane	.04¾	.05
70-72 octane (regular)	.05	.05⅜
60-62 400 grades:		
62 octane and below	.04¼	.04⅜
63-66 octane	.04½	.04¾
67-69 octane	.04¾	.05
70-72 octane (regular)	.05	.05⅜
64-66 375	.04¾	.05
68-70 360	.05	.05¼

PENNSYLVANIA (inland refineries)—

58-60 U. S. Motor:		
Below 60 octane		.05¼
65 octane	.06½	.06¾
68-70 octane	.07	.07¼

CALIFORNIA (domestic movement)—

54-58 U. S. Motor	.06¾	.08¼
58-60 400, 65 oct. and higher	.08½	.09¼

EAST COAST (domestic)—

U. S. Motor, 60-64.9 octane:		
New York (Bayonne)	.06¼	.06½
Philadelphia	.06¼	.06½
Boston	.06½	.06⅝
Baltimore	.06½	.06⅝
Charleston, S. C.	.07	.07¼
U. S. Motor, 65 and above:		
*New York (Bayonne)	.06½	.07
Philadelphia	.06½	.07
Boston	.06¾	.07
Baltimore	.07	.07¼
Charleston, S. C.	.07¼	.07½

*All grades of gasoline one-eighth to one-fourth cent less for barge shipments. New York harbor prices are for New York and New England delivery. Prices for New Jersey delivery one-fourth cent lower.

GULF COAST (domestic)—

U. S. Motor grades:		
Below 60 octane	.05	.05¼
60-64.9	.05¼	.05⅜
65 octane and higher	.05½	.05¾

Naphtha

PENNSYLVANIA (inland refineries)—

52-56 450 (blending)	.04¾	.05

Natural Gasoline

OKLAHOMA (Group 3)—

Grade 26-70	.02	.02½
Grade 18-55	.02⅜	.02½

NORTH TEXAS—

Grade 26-70		.02
Grade 18-55	.02⅜	.02½

CALIFORNIA—

75-85 375-390	.06½	.07

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

Grade 26-70	.02⅜

Tractor Fuel

OKLAHOMA (Group 3)—

40-42 gr., 315-325 l.b.p., 110 flash, 540-550 e.p.	.04	.04⅛
41-43 gr., 300-520 l.b.p., 110-125 flash, 500-520 e.p.	.04⅛	.04¼
46-48 gr., 210-230 l.b.p., 480 max., e.p.	.04½	.04⅝

Kerosene

(All kerosene water white)

OKLAHOMA (Group 3)—

41-43	.04⅛	.04¼
42-44	.04¼	.04⅜

NORTH TEXAS—

41-43	.04⅛	.04¼

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

41-43	.04⅛	.04⅜

ARKANSAS (Ark., N. La., Miss. del.)—

41-43	.04⅜	.04⅝

PENNSYLVANIA (inland refineries)—

45		.05
46		.05⅛
47		.05¼

CHICAGO (Based on Group 3)—

41-43	.04⅛	.04⅜
42-44	.04⅜	.04⅝

CALIFORNIA (Pac. Coast market)—

38-43 high burning test	.05	.06

NEW YORK (Bayonne, N. J.)—

41-43		.05¾

***GULF COAST (domestic)—**

41-43		.04¼

*Barge price one-eighth cent lower.

Furnace Oil

OKLAHOMA (Group 3)—

Range oil	.03⅞	.04
No. 1 prime white, 38-42	.03¾	.03⅞
No. 1 straw, 38-40	.03⅝	.03¾
No. 2 straw, 32-36	.03	.03⅛
No. 2 dark, 32-36	.02⅞	.03⅛
No. 3 zero to 15, 28-32	.02¾	.03
No. 3, 15 and above, 28-32	.02⅝	.02⅞

NORTH TEXAS—

No. 1 prime white, 38-42	.03¾	.03⅞
No. 1 straw, 38-40	.03⅝	.03¾

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

No. 2, 32-36	.03¼	.03½

ARKANSAS (Ark., N. La., Miss. del.)—

No. 2, 32-36	.03¼	.03½

CHICAGO (Based on Group 3)—

Range oil	.03⅞	.04⅛
No. 1 prime white, 38-40	.03¾	.04
No. 1 straw, 38-40	.03⅝	.03⅞
No. 2 straw, 32-36	.03⅝	.03⅝
No. 2 dark, 32-36	.03¼	.03⅜
No. 3, zero to 15, 28-32	.03¼	.03⅝
No. 3, 15 and above, 28-32	.02⅞	.03

NEW YORK (Bayonne, N. J.)—

*No. 1		.05¾
*No. 2		.04¾
*No. 4		.04¾

*Barge deliveries one-eighth to one-fourth cent under above tankcar price.

Gas Oil and Fuel Oil

(Gas oil per gal.; fuel oil per bbl.)

OKLAHOMA (Group 3)—

U.G.I. gas oil	.02⅝	.02¾
No. 4, low cold test, 24-28	1.05	1.10
No. 4, 15 and above, 24-28	.85	.90
No. 5, low cold test, 18-22	.70	.75
Below 18 fuel oil, industrial	.55	.60

NORTH TEXAS—

U.G.I. gas oil	.02⅝	.02¾
No. 4, low cold test, 24-28	1.05	1.10
No, 5 low cold test, 18-22	.70	.75
Below 18 fuel oil, industrial	.55	.60

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

10-14 fuel oil, industrial	.80	.85

CHICAGO (Based on Group 3)—

U.G.I. gas oil	.02⅝	.02⅞
No. 4, low cold test, 24-28	1.05	1.10
No. 4, 15 and above, 24-28	.85	.95
No. 5, low cold test, 18-22	.70	.77½
No. 5, 15 and above, 18-22	.60	.70
No. 6, low cold test, 10-16	.60	.70
No. 6, 15 and above, 10-16	.35	.45

PENNSYLVANIA (inland refineries)—

36-40	.03⅝	.03⅞

CALIFORNIA—

Los Angeles:		
30-40 gas oil, per bbl.	1.25	1.50
24 plus diesel, per bbl.	1.20	1.50
24 plus diesel (bunkers)	1.30	1.55
12-16 (bunkers at tidewater)	.85	.90
10-16 (cargo lots)	.80	.90
12-17 (tankcars)	.60	.90
10-17 (high sulfur)	.55	.85
San Joaquin Valley:		
10-18 (tankcars)	.60	.80
24 plus diesel, per bbl.	1.30	1.50
San Francisco:		
24 plus diesel, per bbl.	1.45	1.55
24 plus diesel (bunkers)	1.50	1.55
10-16 (bunkers)		.95

GULF COAST—

28-30 gas oil	.03¼	.03½
28-30 diesel (bunkers)	1.55	1.75
Bunkers (bulk cargoes)	.72	.75
Bunker C (bunkers)		.80

NEW YORK (Bayonne, N. J.)—

27 plus, gas oil		.04¾
28-30 diesel (lighterage 6¼c per bbl.)		1.85
28-30 diesel (tankcars)	.04¾	.05
Bunker C (to ocean-going ships in N. Y. harbor)		1.05
Industrial fuel (tankcars)	.04	.04¼

Lighterage charge 5c bbl. additional.

Bright and Steam Refined

OKLAHOMA (Group 3)—

190-200 D, 15-25		.19
150-160 D, 0-10	.14½	.16
150-160 D, 15-25	.13½	.15½
150-160 E, 15-25	.13	.15
100-110 D, 0-10		.14½
Steam refined:		
631 green (treated)		.13½
600 dark green (untreated)		.05

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash):		
10 pour test	.16	.16½
15 pour test	.15	.15½
20 pour test	.14	.14½
25 pour test	.13	.13½
Steam refined:		
600	.08½	.09
650	.10½	.11½
600 Pennsylvania flash	.11	.13
630 flash	.14	.15
600 Warren E filtered	.13	.14

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

Zero to 10 Cold Test:		
150-3		.09
180-3		.10
180-4		.09½
200-3		.10½
200-4		.10
250-3		.11½
250-4		.11
280-3		.12½
280-4		.12
300-3½		.13
400-3½		.14
100-2½ paraffin oil		.06
15-20 Cold Test:		
200-3		.10
200-4		.09½
250-3		.11
250-4		.10½
280-3		.12
280-4		.11½

GULF COAST—

Pale Oils:		
200-3	.07	.07½
300-3	.07½	.07¾
500-3½	.08½	.08⅝
750-3½	.08⅝	.09⅛
1,200-3½	.09½	.09⅝
1,500-4	.09⅝	.10
Red Oils:		
200-5-6	.07⅛	.07½
300-5-6	.07⅛	.07½
500-5-6	.08	.08½
750	.08⅝	.09
1,200-5-6	.09⅛	.09½

CALIFORNIA (moving to dom. market)—

Pale Oils:		
100-2½-3	.07⅛	.08
200-2½-3	.07⅛	.08
300-2½-3	.07⅛	.08
400-3-4	.07⅛	.08
450-3-4	.07⅛	.08
550-3-4	.09	.11
600-3-4	.09	.11
Red Oils:		
200-4-5	.07¼	.08
300-5-6	.07¼	.08
350-5-6	.09¼	.11½
400-5-6	.09¼	.11½
450-5-6	.09¼	.11½
500-5-6	.09¼	.11½
600-5-6½	.09¼	.11½
700-6½ plus	.09¼	.11½
750-6½ plus	.09¼	.11½
900-6½ plus	.09¼	.11½

PENNSYLVANIA—

150 vis. at 70° F. color, 400-405 flash:		
Zero pour test	.15	.15½
10 pour test	.14	.14½
15 pour test	.13½	.14
25 pour test	.12½	.13
180 vis. at 70° F., 3 color:		
25 pour test	.14	.14½
200 vis. at 70° F., 3 color:		
Zero pour test	.16½	.17
10 pour test	.15½	.16
15 pour test	.15	.15½
25 pour test	.14	.14½

Wax and Petrolatum

(Prices per pound)

OKLAHOMA (Group 3)—

124-126 (a.m.p.) w.c. scale	.02⅛	.02¼

PENNSYLVANIA (inland refineries)—

122-124 (a.m.p.) w.c. scale	.0190	.0200
124-126 (a.m.p.) w.c. scale	.0190	.0200

NEW YORK—

Wax in bags fully refined:		
122-125 (a.m.p.) wax		.0420
125-127 (a.m.p.) wax		.0435
128-130 (a.m.p.) wax		.0445
130-132 (a.m.p.) wax		.0455
133-135 (a.m.p.) wax		.0500
135-137 (a.m.p.) wax		.0515
124-126 (a.m.p.) w.s.		.0185
124-126 (a.m.p.) y.s.		.0185
Petrolatum in barrels, carload lots:		
Dark green	.02	.02⅛
Amber	.02⅜	.02½
Extra amber	.02⅝	.02¾
Lily white	.05¼	.05½
Snow white	.06⅛	.06¼
Cream	.04¼	.04½

Export Prices

GASOLINE

GULF COAST—

U. S. Motor	.04⅞	.05
60-62 400	.04⅞	.05
61-63 390	.05	.05⅛
64-66 375	.05	.05⅛

LOS ANGELES—

U. S. Motor grades:		
55-65 octane	.05¼	.05½
65-69 octane		.05¾
Above 69 octane		.06¼

KEROSENE

GULF COAST—

41-43 prime white	.04⅜	.04⅝
41-43 water white	.04½	.04¾
44 water white		.04¾

LOS ANGELES—

41-43 water white	.05	.05¼

LUBRICANTS

(Pennsylvania Grade)

NEW YORK (f.a.s. in bbls.)—

Cylinder Stocks:		
600 Warren E	.14½	.15
600 S.R. unfiltered	.15½	.16
630 S.R. unfiltered	.17½	.18
600 flash S.R.	.17½	.18
630 flash, S.R.	.21	.21½
Bright Stocks:		
8 color	.21½	.22
6½ plus color in dilution		.21

NEUTRAL OIL

200-3 color	.23½	.24
150-3 color	.21½	.22

PARAFFIN WAX

NEW YORK (prices per pound)—

123-126 a.m.p.		.0375
125-127 a.m.p.		.0387
128-130 a.m.p.		.0412
133-135 a.m.p.		.0437
135-137 a.m.p.		.0455
Crude Scale:		
124-126 w.s.	.0185	.0200
124-126 y.s.	.0185	.0200

Crude Oil Prices

Oklahoma, Kansas, North Central and East Central Texas

(Effective January 28, 1937)

East Texas (May 22, 1937)*	$1.35
Van, Tex.†	1.10
Camp Hill, Tex.	1.27
Cass County, Tex.‡	1.25
Talco	.73
Altus and Tipton, Okla.§	1.20
Other fields (see gravity table).	

*All companies. †Humble Oil & Refining Co.; Pure Oil Co. ‡Texas Co. §Gulf Oil Co. Talco by Humble Oil & Refining Co.

North Louisiana and Arkansas

Smackover, all grades	$ .90
Tullos and Urania	1.02
El Dorado East field	.90
Union County, Ark.	.90
Ouachita County, Ark.	.90
Lisbon, La. (Dec. 13, 1937)*	.98

*Caddo Crude Oil Purchasing Co.

Gulf Coast

(Effective January 28, 1937)

Choctaw and Darrow, La. See note below	
Clay Creek, Tex.	$1.00
Garden Island, La.	1.37
Cleveland, Tex.	1.27
Hardin, Tex.	1.15
Lafitte, La.	1.24
Livingston, Tex.	1.27
Welsh, La.	.98
Tepetate (La.) (Jan. 28, 1937)	1.24

Duval, Jim Hogg, Webb and Zapata counties, Texas, and Heyser and Placedo fields take Mirando gravity prices. Jennings, La., 5 cents lower than Gulf Coast prices on each degree. Segno, Texas, takes Gulf Refining Co.'s Gulf Coast prices. Choctaw and Darrow, Louisiana, posted for first time by Standard Oil Co. of Louisiana, start below 21 degrees at 90 cents, with 3-cent differential up to 25 gravity, then 2-cent differential up to 40 and above, $1.36. Effective October 1, 1937, Stanolind Oil & Gas Co. in Evangeline, La., pays 92 cents for below 20 gravity, adding 2 cents for each degree upward to 40 and over, at $1.34.

Rocky Mountain States

(Effective January 28, 1937)

Iles, Colo., light*	$1.18
Iles, Colo., heavy*	1.12
Greybull, Wyo.*	1.30
Torchlight, Wyo.*	1.30
Grass Creek, Wyo., light*†	1.30
Grass Creek, Wyo., heavy (May 1, 1938)*	.50
Hamilton Dome, Wyo. (May 1, 1938)*	.45
Elk Basin, Wyo., light*†	1.30
Frannie, Wyo., heavy*	.62
Frannie, Wyo., light (May 1, 1938)*	.65
Hogback, N. M. (Jan. 28, 1937)*	1.33
Salt Creek, Dutton Creek and Midway, Wyo., take Stanolind's Oklahoma prices on a gravity basis.	
Big Muddy, Wyo.†‡	1.23
Rock Creek, Wyo.†	1.20½
Lea County, N. M. (see West Texas gravity table).	
Artesia, N. M. (Jan. 2, 1937)‡	.90
Maljamar, N. M. (Jan. 28,1937)‡	.90
Canon City and Florence, Colo.	1.10
Lance Creek, Wyo.*	.97
Lander, Wyo. (Jan. 1, 1938)§	.51¼
Sunburst, Mont. (Nov. 16, 1937)†	.90
Cat Creek, Mont. (Jan. 1, 1938)‡	$1.30
Garland, Wyo. (Jan. 1, 1937)†	.50

*Stanolind Oil & Gas Co. †Ohio Oil Co. ‡Continental Oil Co. Texas Co. (April 1, 1938). §Hudson Oil Co.

Middle Western States

OHIO OIL CO.
(Effective January 28, 1937)

Lima	$1.00
Illinois	1.35
Princeton, Ind.	1.35
Midland, Mich. (Jan. 5, 1938)*	1.12
West Branch, Mich. (Dec. 29, 1937)†	.80
Buckeye (Jan. 8, 1938)	1.09½
Arenac, Mich. (Dec. 29, 1937)†	.80
Muskegon, Mich.	1.00
Eastern Kentucky:	
Big Sandy River	1.42
Kentucky River	1.50
Western Kentucky	1.40

*Posted by Pure Oil Co.
†McClanahan P. L. and Simrall.
Midland, Mich., price posted by Simrall Corp. and Pure Oil Co. includes Greendale, Porter, Beaverton, Crystal and equal grades. West Branch and Arenac by Simrall Corp. Eastern Kentucky crude purchased by Ashland Refining Co., Ashland, Ky. Buckeye posted by Simrall Corp. and Pure Oil Co.

West Texas

See gravity table.

Pecos County*	$ .91
Pecos shallow†	.81

*Shell Petroleum Corp., Gulf Pipe Line Co. and Humble Oil & Refining Co. †Shell Petroleum Corp.

Southwest Texas

(Effective January 28, 1937)

Pettus	$1.37
Salt Flat, Darst Creek, Hilbig, Carroll, Clark, Zoboroski	1.09
Lytton Springs	1.12
Luling	1.00

Saxet and Taft take same gravity table as Gulf Coast.

Eastern States

TIDE WATER ASSOCIATED OIL CO.
(Effective March 7, 1938)

Bradford, Pa.	$2.05
Allegany, N. Y.	2.05

SOUTH PENN OIL CO.
(Effective March 7, 1938)

Pennsylvania Grade Oil in National Transit Lines (Bradford field)	2.05
Pennsylvania Grade Oil in Southwest Pennsylvania Lines	1.71
Pennsylvania Grade Oil in Eureka Pipe Line lines	1.65
Pennsylvania Grade Oil in Buckeye Pipe Line lines	1.55
Corning Grade Oil in Buckeye Pipe Line Co.'s lines	1.27

PENNZOIL CO.
(Effective March 7, 1938)

Pennsylvania Grade Oil in National Transit Lines:	
Group A	1.98
Includes, Cochran, Franklin, Hamilton and Doolittle districts.	
Group B	1.97
Includes Tidioute district.	
Group C	1.96
Includes Turkey and Tidioute districts.	
Group D	1.95
Includes Bear Creek and Porkey districts.	
Group E	1.90
Includes Eldeneau, Bull Creek, Rough Run, Carbon, Dipner, Bredlin, McJunkin, Jameson, Kenerdell, Emlenton, Tiona, Lacey and Kinzua districts.	

PURE OIL CO.
(Effective March 7, 1938)

Cabin Creek, W. Va.	$1.65
Bradford Hollow, W. Va.	1.65
Kelly Creek, W. Va.	1.65

Canada

Ontario (Sept. 9, 1933)*

Petrolia	$2.10
Oil Springs	2.17

TURNER VALLEY NAPHTHAS AND CRUDE OIL
(January 5, 1938, by Imperial Oil, Ltd.)

Clear naphtha and discolored naphtha, 65 gravity and higher	$2.14
Discolored naphtha and crude oil, 40-40.9 gravity	1.14
Increasing 2 cents for each degree gravity with top price for 64-64.9 gravity	1.62

These prices f.o.b. producers field tankage.

*Imperial Oil, Ltd.

Mexico

Heavy Mexican crude	*$.85

*In U. S. currency, f.o.b. ship, based on February spot market transactions.

Crude Prices by Gravities

	1 Oklahoma-Kansas	2 Oklahoma-Kansas	3 North and Central Texas	4 East Central Texas (Mexia district)	5 North Louisiana-Arkansas	6 Gray County, Texas	7 Hutchinson-Carson counties, Texas	8 Rodessa, Louisiana-Texas and Panola County, Texas	9 Conroe, Tomball, Raccoon Bend, (Deep) Satsuma	10 Gulf Coast	11 Gulf Coast	12 Lea County, N. Mex. West Texas except Pecos County	13 Mirando district, Texas	14 Marion County, Texas	15 Refugio, Greta, Saxet, Taft, Texas	16 Anahuac, Flour Bluff, Dickson, Turtle Bay	17 White Castle, Louisiana	18 Iowa, Louisiana	19 Cayuga, Texas
Bel. 18	....	....	....	....	....	....	....	....	....	$ .95	....	....	....	....	....	....	....	....	$ .90	....
18-18.9	....	....	....	....	....	....	....	....	....	.95	....	....	....	....	....	....	....	....	.92	....
19-19.9	....	....	....	....	....	....	....	....	....	.95	....	....	....	....	....	....	....	$ .94	.94	....
20-20.9	....	....	....	....	....	....	....	....	....	.95	$ .95	....	$ .96	....	$1.01	....	....	.96	.96	....
21-21.9	....	....	....	....	....	....	....	....	....	.98	.98	....	.98	....	1.03	....	....	.98	.98	....
22-22.9	....	....	....	....	....	....	....	....	....	1.01	1.01	....	1.00	....	1.05	....	....	1.01	1.01	....
23-23.9	....	....	....	....	....	....	....	....	....	1.04	1.04	....	1.02	....	1.07	....	....	1.04	1.04	....
24-24.9	....	....	....	....	....	....	....	....	....	1.07	1.07	....	1.04	....	1.09	....	....	1.07	1.07	....
Bel. 25	....	$ .98	....	....	$ .90	....	....	$ .93	....	....	....	....	....	$ .90	....	....	....	....	....	$ .88
25-25.9	....	1.00	....	....	.92	....	....	.95	....	1.10	1.10	$ .78	1.06	.92	1.11	....	....	1.10	1.10	.90
26-26.9	....	1.02	....	....	.94	....	....	.97	....	1.13	1.13	.80	1.08	.94	1.13	....	....	1.13	1.13	.92
27-27.9	....	1.04	....	....	.96	....	....	.99	....	1.15	1.15	.82	1.10	.96	1.15	....	....	1.15	1.15	.94
28-28.9	....	1.06	....	....	.98	....	....	1.01	....	1.17	1.17	.84	1.12	.98	1.17	....	....	1.17	1.17	.96
Bel.29	$1.06	$ .96	$1.03	....	....	....	....	....	1 20	....	....	....	....	....	....	....	....	....	....	....
29-29.9	1.08	1.08	.98	1.05	1.00	....	....	1.03	1 22	1.19	1.19	.86	1.14	1.00	1.19	....	....	1.19	1.19	.98
30-30.9	1.10	1.10	1.00	1.07	1.02	....	....	1.05	1 24	1.21	1.21	.88	1.16	1.02	1.21	$1.16	1 21	1.21	1.21	1.00
31-31.9	1.12	1.12	1.02	1.09	1.04	....	....	1.07	1 26	1.23	1.23	.90	1.18	1.04	1.23	1.18	1 23	1.23	1.23	1.02
32-32.9	1.14	1.14	1.04	1.11	1.06	....	....	1.09	1 28	1.25	1.25	.92	1.20	1.06	1.25	1.20	1 25	1.25	1.25	1.04
33-33.9	1.16	1.16	1.06	1.13	1.08	....	....	1.11	1 30	1.27	1.27	.94	1.22	1.08	1.27	1.22	1 27	1.27	1.27	1.06
34-34.9	1.18	1.18	1.08	1.15	1.10	....	....	1.13	1 32	1.29	1.29	.96	1.24	1.10	1.29	1.24	1.29	1.29	1.29	1.08
Bel. 35	....	....	....	....	....	$ .96	$ .91	....	....	....	....	....	....	....	....	....	....	....	....	....
35-35.9	1.20	1.20	1.10	1.17	1.12	.98	.93	1.15	1 34	....	1.31	.98	1.26	1.12	1.31	1.26	1 29	1.29	....	....
36-36.9	1.22	1.22	1.12	1.19	1.14	1.00	.95	1.17	1 36	....	1.33	1.00	1.28	1.14	1.33	1.28	1 29	1.29	....	....
37-37.9	1.24	1.24	1.14	1.21	1.16	1.02	.97	1.19	1 38	....	1.35	1.02	1.30	1.16	1.35	1.30	1 29	1.29	....	....
38-38.9	1.26	1.26	1.16	1.23	1.18	1.04	.99	1.21	1 40	....	1 37	1.04	1.32	1.18	1.37	1.32	1 29	1.29	....	....
39-39.9	1 28	1.28	1.18	1.25	1.20	1.06	1.01	1.23	1.42	....	1.39	1.06	1 34	1.20	1.39	1.34	1 29	1.29	....	....
40,over	1.30	1.30	1.20	1.27	1.22	1.08	1.03	1.25	1 44	....	1.41	1.08	1.36	1.22	1.41	1.36	1 29	1.29	....	....

Column 1—Companies posting are Barnsdall, Bell, Champlin, Continental, Cushing, Derby, Bay, Eason, El Dorado, Cities Service, Falcon, Globe, Gulf, Johnson, National, Phillips, White Eagle, Stanolind, Sunray, Texas, Sun, Vickers and Wilcox.
Column 2—Anderson & Prichard, Carter, Cosco, Deep Rock, Magnolia, Mid-Continent, Pure, Rock Island, Shell, Sinclair, Skelly and Tide Water.
Column 3—All purchasers.
Column 4—Humble Oil & Refining Co. and Sinclair Oil Purchasing Co.
Columns 5, 6, 7 and 8—All purchasers.
Column 9—Humble Oil & Refining Co. and Sun Oil Co. Tide Water Oil Co.'s schedule starts at 35 degrees, $1.34 with 2-cent spread up to 40 and over at $1.44. (Raccoon Bend prices are for deep sand oil.)
Column 10—The Texas Co. (Gulf Refining Co. pays same prices up to and including 34 gravity, but continues its 2-cent spread up to 40 and over at $1.41.)
Column 11—Humble Oil & Refining Co., Sinclair Prairie Oil Marketing Co., Sun Oil Co.
Column 12—All purchasers.
Column 13—All purchasers (effective July 6, 1937).
Column 14—Magnolia Petroleum Co.
Column 15—Humble Oil & Refining Co. (effective July 6, 1937).
Column 16—Humble Oil & Refining Co.
Columns 17 and 18—Shell Petroleum Corp.
Column 19—Tide Water Oil Co.

Rocky Mountain Runs

Production estimates for week ended May 21.

	Bbls.
WYOMING	
Salt Creek	15,860
Big Muddy	1,280
Badger Basin	150
Black Mountain	150
Dallas Derby	580
Dutton Creek	40
Elk Basin	30
Frannie	1,550
Garland	2,500
Grass Creek	3,570
Hidden dome	140
Hudson	300
LaBarge	920
Lance Creek	10,380
Lost Soldier	1,560
Medicine Bow	3,180
Mule Creek	140
Midway	40
Oregon Basin	1,850
Osage	910
Pilot Butte	20
Quealy dome	690
Rock River	890
South Casper	490
Poison Spider	280
Teapot	20
Warm Springs	70
Wertz	700
Total Wyoming	48,290
MONTANA	
Cat Creek	500
Cut Bank	7,410
Dry Creek	1,490
Kevin-Sunburst	3,200
Pondera	1,030
Total Montana	13,630
COLORADO	
Florence	190
Fort Collins and Wellington	250
Iles dome	2,420
Moffat	430
Orchard	40
Rangely	90
Tow Creek	160
Price	10
Total Colorado	3,590
NEW MEXICO	
Cooper	4,520
Eaves	840
Eunice	23,280
Hardy	1,640
Hobbs	13,700
Jal	1,110
Langlie	3,200
Lynch	540
Lynn	770
Mattix	2,540
Monument	24,250
North Lynch	40
Penrose	4,510
Rhoades	80
Skelly	1,610
South Eunice	2,560
Vacuum	1,330
Artesia-Maljamar	5,870
Getty	180
Hogback	180
Rattlesnake	740
Table Mesa	70
Total New Mexico	93,560
Total Rocky Mountain region	159,070

Logan H. Goodnight, of Los Angeles, Calif., member of the drilling contracting firm of Bass & Goodnight, is in Abilene, Tex., completing arrangements to drill a wildcat well on the firm's Chittenden ranch in West Central Texas.

Market Record of Active Oil Stocks

Compiled by Carl H. Pforzheimer & Co., 25 Broad Street, New York City, Member New York Stock Exchange and New York Curb Exchange

New York Stock Exchange

1938 High	1938 Low	Week ending May 21 Sales	High	Low	Close	Stocks—	Total shares outstanding	Par value	Latest dividend	Payable or last paid	Dividends paid in 1937	1937 High	1937 Low	1936 High	1936 Low
72½	57	900	64	58½	58½	Amerada Corp.	788,675	N.P.	50cQ	4-30-38	$2.00	114⅞	51½	125½	75
24	17¾	5,600	21¾	20	20	Atlantic Refining	2,663,999	$25	25cQ	6-15-38	1.00	37	18	35⅛	26⅝
19	12⅛	1,400	16½	15½	15½	Barber Co.	387,149	$10	75c	12-16-37	1.00	43⅜	10⅛	38½	21
16⅜	10⅛	12,100	13½	12¾	12¾	Barnsdall Oil Co.	2,250,344	$5	25cQ	5-2-38	1.00	35¼	10	28¼	14⅛
10½	7	9,000	8⅝	8¼	8¼	Consolidated Oil Corp.	13,919,417	N.P.	20cQ	5-14-38	.90	17⅞	7	17¼	11½
34⅜	21¼	10,700	26¼	24¼	24¼	Continental Oil of Delaware	4,682,583	$5	25cQ	6-30-38	1.50	49	24	44⅞	28⅛
8⅞	5	3,500	6⅞	6⅜	6⅜	Houston Oil (new)	1,098,618	$25	....	10-17-30	....	17⅝	4⅜	13⅞	6⅝
22⅝	12¼	4,800	17	15½	15½	Mid-Continent Petroleum	1,855,912	$10	25c	6-1-38	1.50	35⅝	14	30⅞	17¼
17¾	11	500	13	12	12	Mission Corporation	1,399.345	N.P.	25c	12-24-37	1.25	34	15	29⅞	16⅝
23	14⅛	2,500	17½	15¾	15¾	National Supply	382,591	$25	$2 pf.‡	12-22-37	(‡)	41⅝	17⅝	75½	19⅞
14⅞	9⅜	14,600	10	9⅜	9⅜	Ohio Oil Co.	6,563,377	N.P.	50cSA	12-15-37	1.00	22⅞	9	18	12⅛
15⅞	10¼	900	10½	10⅜	10½	Pacific Western Oil	1,000,000	N.P.	75c	12-15-37	.75	29¾	11⅜	23½	11⅜
9¼	7	No sales ..	..	..	..	Pan American Pet. & Trans.	4,702,945	$5	$1 *	12-21-37	1.00	17⅛	7	20⅝	12¼
42½	27¼	9,300	33	31	31	Phillips Petroleum	4,449,052	N.P.	50cQ	6-1-38	2.75	64	30⅛	52⅝	38⅛
20	15	3,200	18⅝	17½	17¾	Plymouth Oil Co.	1,029,800	$5	35cQ	9-30-37	1.65	29⅞	13	27⅜	11⅞
13½	8½	13,700	9¾	8¾	8⅞	Pure Oil Co.	3,281,120	N.P.	25c	12-1-37	.25	24⅜	8¾	27⅞	16
7⅞	5	8,700	5⅞	5⅛	5⅛	Richfield Oil Corp.	3,285,120	N.P.	25c	12-24-37	.25	6½	4⅛	.	.
27½	15½	1,500	19⅝	18	18	Seaboard Oil of Delaware	1,224,283	N.P.	25cQ	6-15-38	1.00	54⅛	16	44	30½
18¼	10	1,100	13	12½	12½	Shell Union Oil	13,070.625	N.P.	50c	12-20-37	1.00	34¾	14⅞	28¼	14⅜
34¾	18½	900	22	21¼	21¼	Skelly Oil	1,003,949	$15	50c	12-15-37	1.50	60⅝	26½	47⅜	19½
16⅜	10¾	25,100	13⅜	12¼	12¼	Socony-Vacuum	31,151,071	$15	25c	3-15-38	.80	23¼	13	17½	12½
33⅞	25½	12,600	27⅝	26⅛	26½	Standard Oil of California	13,014,754	N.P.	35cQ†	3-15-38	2.00	50	27⅛	47⅝	35
35½	24¾	4,900	29¼	28⅜	28½	Standard Oil (Indiana)	15,267,030	$25	25cQ	3-15-38	2.30	50	26½	48½	32¾
35½	32¼	No sales ..	..	..	..	Standard Oil of Kansas	112,837	$10	$5	12-20-37	5.00	43	30⅝	31	25
54⅛	39¾	13,000	48¼	46⅛	46⅛	Standard Oil of New Jersey	25,856,081	$25	$1.25SA†	6-15-38	2.50	76	42	70⅝	51⅛
57⅞	45	500	50½	49½	49½	Sun Oil	2,316,484	N.P.	25cQ	6-15-38	$1 & 8% Stk.	77½	44½	91	70
3⅜	1¾	1,300	2½	2⅜	2⅜	Superior Oil Corp.	1,388,079	$1	....	....	....	7¾	1½	6¾	3
44⅞	32⅝	38,000	37½	35⅝	35⅝	Texas Corp.	10,875,006	$25	50cQ	4-1-38	2.25	65½	34¾	55¼	28⅞
4⅞	2⅝	3,400	3½	3⅜	3⅜	Texas Gulf Producing Co.	888,135	N.P.	10c	12-23-37	.10	9⅝	2	8⅞	4⅜
10⅛	7	1,700	8½	8⅛	8⅛	Texas Pacific Coal & Oil	888,237	$10	10c	6-1-38	.40	16⅝	5⅜	15¼	7½
15½	10⅛	9,300	12¾	11½	11½	Tide Water Associated	6,369,175	N.P.	25cQ	6-1-38	1.20	21⅝	13⅛	21⅜	14⅜
21⅝	17⅛	4,100	18½	17¾	18	Union Oil of California	4,666,270	$25	30cQ	5-10-38	1.40	28¼	17½	28½	20⅜
23½	20	1,200	21	20	21	Union Tank Car Co.	1,200,000	N.P.	40cQ	3-1-38	1.60	31½	22	31⅝	22⅝
2¾	1⅝	300	2⅛	2⅛	2⅛	Wilcox Oil & Gas	424,839	$5	....	5-10-28	....	6¼	1¾	5¼	2¾

*Payable in 3⅛% notes. †Includes extras. ‡One-tenth share $2 preferred stock.

New York Curb Exchange

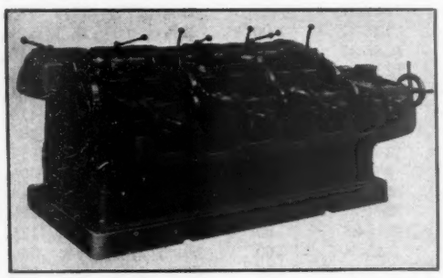
1938 High	1938 Low	Week ending May 21 Sales	High	Low	Close	Stocks—	Total shares outstanding	Par value	Latest dividend	Payable or last paid	Dividends paid in 1937	1937 High	1937 Low	1936 High	1936 Low
9⅜	5	800	6¾	6⅛	6⅛	American Republics Corp.	1,308,049	$10	30c	12-27-37	$0.40	10	6⅝	.	.
10¼	5¼	1,300	6⅜	5¾	5¾	Bridgeport Machine Co.	260,000	N.P.	1.25	12-30-37	$2.00	21⅜	7	21	13¼
39	32½	No sales ..	..	..	..	Buckeye Pipe Line Co.	200,000	$50	50cQ	6-15-38	3.75	51½	36	50	39¾
110	97	150	103	101½	103	Chesebrough Mfg. Co.	120,000	$25	$1.50Q†	6-27-38	7.00	123	95½	124¾	105
11	7¾	1,200	10⅛	9¾	9¾	Cities Service (new)	37,804,394	N.P.	....	6-1-32	....	5⅜	1½	7⅝	3
2⅜	1	2,700	1⅛	1	1⅛	Cosden Petroleum	399,687	$1	....	....	....	5½	1½	4½	1⅛
27½	17½	3,900	22	21⅛	21⅛	Creole Petroleum	6,974,356	$5	50cSA†	6-10-38	1.00	38¾	20¼	39	19⅞
8¾	5½	400	7	6⅝	7	Darby Petroleum	351,390	$5	25cSA	1-15-38	.50	18⅝	6½	18⅛	9
3½	2	500	2½	2¼	2¼	Derby Oil & Refining	263,162	N.P.	....	....	....	8⅜	2¼	6⅜	1⅞
31	22⅝	No sales ..	..	..	..	Eureka Pipe Line	50,000	$50	$1Q	5-2-38	4.00	47½	24½	47½	38½
42⅞	33	1,000	35¾	35	35	Gulf Oil Corp.	9,076,202	$25	25cQ	4-1-38	1.00	63½	33	59	36
70	56	2,900	67⅛	63	63	Humble Oil & Refining	8,923,935	N.P.	37½c	7-1-38	2.00	87	54⅞	80	57
19½	15	5,800	17⅛	16⅞	17	Imperial Oil of Canada	26,919,871	N.P.	62½cSA†‡	6-1-38	1.25	24¼	14½	24½	19⅜
8¼	6⅝	100	7⅝	7⅝	7⅝	Indiana Pipe Line	300,000	$10	30c	5-14-38	.80	15	5⅞	9¾	5½
31¼	23	5,400	27⅞	26⅛	26⅜	International Petroleum	14,247,088	N.P.	$1.25†‡	6-1-38	2.50	39½	23½	39⅝	32¾
5	3¼	600	3½	3⅜	3½	Kirby Petroleum Co.	500,000	$1	10c	4-15-38	....	8¾	2⅜	5⅜	2⅝
25⅛	15⅝	1,300	20⅛	19	19	Lion Oil Refining	434,820	N.P.	50cQ†	12-24-37	1.50	34	12½	17¾	7⅜
9¼	6⅝	2,600	8¼	7¾	7¾	Lone Star Gas	5,382,723	N.P.	20c	4-20-38	.60	14¼	5¼	14¼	9⅞
9⅜	6½	2,000	7⅝	6⅞	6⅞	Louisiana Land & Exp.	3,000,000	N.P.	20cQ†	12-15-37	.50	15¼	6¾	15⅝	9⅜
8½	6⅜	1,400	8	7½	7½	Midwest Oil Co.	998,444	$10	50c	6-15-38	1.00	14⅝	6¼	..	..
5¼	4½	100	5	5	5	Mountain Producers	1,682,182	$10	30cSA	12-15-37	.60	7⅞	4⅛	8⅝	5
14⅝	12⅛	900	14	13⅜	13⅜	National Fuel Gas	3.810,183	N.P.	25cQ	1-15-38	1.00	19½	12	23	17⅜
9¼	7⅝	700	8¼	7¾	8¼	National Transit	509,000	$12.50	35cSA	6-15-38	1.00	12½	7¼	15⅜	9¼
2⅝	1½	300	1¾	1¾	1¾	New Mexico and Arizona	1,000,000	$1	1c	12-1-36	....	5	1⅛	6⅝	1⅝
4½	4	No sales ..	..	..	..	New York Transit	100.000	$3	15c	4-15-38	1.00	5⅜	3⅞	6¼	4¼
6	4	No sales ..	..	..	..	Northern Pipe Line	120,000	$10	20c	6-1-38	1.00	12¾	5¾	9¾	4⅝
7⅜	3¾	12,600	5	4¾	4¾	Pantepec Oil	1,608,700	N.P.	.	.	....	9⅝	2¾	10⅛	3¼
3½	1⅝	300	2	2	2	Root Petroleum Co.	336,045	$1	25c	2-1-37	.25	13¾	2	19¼	4½
4	2⅛	100	2½	2½	2½	Ryan Consolidated	296,931	N.P.	.	.	....	6½	2¼	4¾	1⅞
5⅜	3⅜	No sales ..	..	..	..	Southern Pipe Line	100.000	$10	15cSA	3-1-38	.45	7¼	3⅜	7⅞	3¼
39	28¾	200	33	33	33	South Penn Oil	1,000,000	$25	50cQ†	3-31-38	3.65	56	35	44	32½
22¼	19½	No sales ..	..	..	..	Southwest Penna. Pipe Lines	35.000	$50	50cQ	4-1-38	2.00	42	20	60	44
18	15	800	16⅞	16⅛	16⅝	Standard Oil of Kentucky	2,604,790	$10	25c	6-15-38	1.50	21½	14¾	23⅜	17⅛
7½	6⅛	100	6¾	6¾	6¾	Standard Oil of Nebraska	166.403	$25	25c	3-29-37	.25	13¾	8	14⅝	11
22	16¼	300	18½	18¼	18⅜	Standard Oil of Ohio	753,740	$25	25c	6-15-38	1.50	45	16	40	21⅜
3¼	2⅛	1,600	2½	2⅜	2½	Sunray Oil	1,910.119	$1	10c	12-24-37	.25	4⅞	2	5	2⅝
4⅜	3½	200	4⅛	4⅛	4⅛	Texon Oil & Land	336,028	$2	15cQ	6-30-38	.45	7⅝	2	9⅜	5⅝
7⅝	4⅝	400	5¼	5¼	5¼	Transwestern Oil Co.	750,000	$10	....	.....	....	13⅞	4⅝	..	..
5¼	2¾	6,900	3¾	3½	3⅝	United Gas Corp.	7,818,959	$1	....	.....	....	13⅝	3	10⅜	4

†Includes extras. ‡Payable in Canadian funds. §Of which $1 was in preferred stock.

New or Improved Equipment

Addition to Line of Threading Devices Is Offered by Landis

The Landmaco quadruple-head threading machine, announced by Landis Machine Co., Waynesboro, Pa., offers four threading units assembled on a single bed structure. It has all the mechanical features of the Landmaco threading machine. Production possibilities in certain classes of threading operations are greatly increased because of the two additional threading units. This machine is particularly adaptable to jobbing and maintenance work.



A selective-type gearbox provides eight threading speeds. The gears, cut from chrome-nickel steel, are hardened and burnished to insure smoothness of operation and maximum wearing qualities. Antifriction bearings are employed throughout for all gear-shafts. The main spindle is driven by a spiral bevel gear and is mounted on a preloaded antifriction bearing at the die-head end. This feature is designed to eliminate possibility of wear or end play in the spindle. The guides are covered by telescoping steel guards which protect them from chips. Wipers at the rear of the carriage reduce the likelihood of chips working under the carriage and thus causing excessive wear of the guides.

The center distances between die-heads are the same as those on the Landmaco double-head machine. Since the center-to-center measurements are comparatively short, one man can operate the four die-heads and obtain maximum efficiency of the machine.

Bulletins, Booklets and Other Literature for the Trade

Copies of "6 Minutes with 6 Metals" may be obtained from the International Nickel Co., Inc., 67 Wall Street, New York. This 16-page booklet tells the characteristics and uses of the special alloys such as Inconel, K, S, and R monel, as well as the more generally known monel and nickel.

"Standing on the toes is a good way to keep from getting flat feet, and keeping on the toes is a good way to keep from getting flat broke," says the Bridgeport Bulletin, published by the Bridgeport Machine Co., Wichita, Kans.

A new type of crownblock and traveling-block, made under the L. C. Black patents for use on oil well derricks by the Emsco Derrick & Equipment Co., Los Angeles, Calif., is the subject of an article in the April issue of the Amsco Bulletin, published by the American Manganese Steel Division of the American Brake Shoe & Foundry Co., Chicago Heights, Ill.

The Oil Well Supply Co. has released three "Oil-well" bulletins: No. 184 on No. 6-P power-driven pump; No. 147, cable-tool drilling units, and No. 173, packers.

The Steel Buyer's Guide is a handy pocket-size book which lists and describes the wide range of certified steels and allied products carried in stock by Joseph T. Ryerson & Son, Inc., Chicago. Handy reference tables, weight charts, standard specification listings, etc., are included.

Lane-Wells Co., 5610 South Soto Street, Los Angeles, Calif., has issued two new bulletins on the company's small and standard magnetic-survey instruments.

A bulletin giving specifications and operating characteristics of the Cameron Class GT two-stage centrifugal pump has been issued by Ingersoll-Rand Co., 11 Broadway, New York.

Three bulletins are announced by Baldwin-Duckworth Chain Corp., Springfield, Mass.: No. 56A, Full Flex oil-field chain; No. 62A Super-service oil-field chain, and No. 64, Master rotary chain.

Development of directional drilling is discussed in the current number of Tomorrow's Tools Today, published by Lane-Wells Co., Los Angeles, Calif. The Lane-Wells knuckle-joint, a modern deflection tool, is described.

The current issue of the Armstrong Trap Magazine, published by Armstrong Machine Works, Three Rivers, Mich., stresses the advantages of Armstrong traps in refrigeration service.

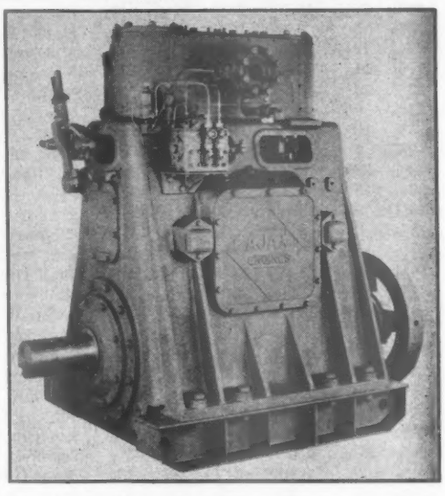
A bulletin announced by Combustion Engineering Co., Inc., 200 Madison Avenue, New York, illustrates typical large fabricated products and pressure vessels, such as bubble-towers, autoclaves, cylinders, flash-towers, crystallizers, digesters, tanks, etc.

LAMINATED SHIMS CONVENIENT

The diesel division of the Fulton Iron Works Co., St. Louis, Mo., utilizes the convenience and quick-adjustment features of laminated shims in the assembly of main and thrust bearings of its diesel engines. Such shims, which peel for adjustment, are said to be especially valuable in maintaining the proper running clearance of bearings throughout field service.

Variety of Uses on Rotary Rig Is Offered by New Ideal-Ajax

A new vertical piston valve roller-bearing heavy-duty steam drilling engine, possessing exclusive features, has been announced by Ajax Iron Works, Corry, Pa., and National Supply Co., distributor. The new Ideal-Ajax is built in the popular 9 x 8 size, as well as 7 x 8, 8 x 8, and 9½ x 8, for 350 pounds working steam pressure.



The engines are distinguished by a force-feed cylinder lubrication and a combination force-feed and splash engine lubricating system which provides positive pressure lubrication to all vital wearing points; antifriction bearings in crosshead; heavy 6½-inch diameter double throw counterbalanced forged-steel crankshaft, supported in two double-row tapered roller bearings, interchangeable cylinder-blocks, and other improvements making for greater efficiency, long life and operating economy.

Among applications on a rotary rig are: Direct drive to rotary machine; dual drive to slushpump, rotary machine, and drawworks; direct drive to slushpumps by means of V-belts or chain.

Tests conducted by the National Supply Co. and the Ajax Iron Works are reported to have shown that an Ideal-Ajax steam engine driving a slushpump operates with a steam consumption as low as 28½ pounds per indicated horsepower, which is about 40 per cent less than the steam consumption of a direct-acting steam pump under similar operating conditions.

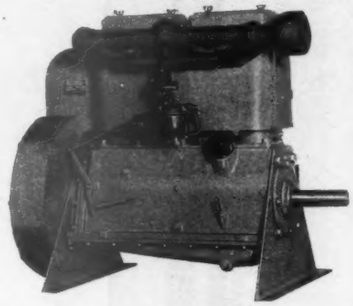
A hand-controlled variable cut-off valve gear, high safe operating speeds, and wide flexibility of application are among advantages named.

Le Roi Co. Enlarges Plant

Twenty-five thousand square feet of floor space has been added to the Milwaukee, Wis., plant of Le Roi Co., manufacturer of heavy-duty internal-combustion engines, air-compressors and engine-driven generator units. This addition provides space for a new production machine line to handle certain sizes of cylinder-blocks and cylinder-heads. Modern high-speed machine tools are equipped with specially designed jigs and fixtures. A conveyor system serves this machine line. Contained in the addition are a display room, a new assembly line and additional storage space for the company's standard line of air-compressors and its new streamlined Airmaster portable series.

Heavy-Duty Air-Cooled Engine Offered by Wisconsin Motor

Because of the demand for air-cooled engines of greater horsepower, the Wisconsin Motor Corp., Milwaukee, Wis., has added the Model AM4 four-



cylinder air-cooled engine to its line, thus providing a range of air-cooled engine sizes from 1 to 28 horsepower single- and four-cylinder models.

The new Model AM4 has a 3¼-inch bore by 4-inch stroke and a piston displacement of 132 cubic inches. It develops 16 horsepower at 1,200 r.p.m., 22 horsepower at 1,600 r.p.m., 25 horsepower at 1,800 r.p.m. with a peak of 28 horsepower at 2,400 r.p.m.

Some of the features are light weight, only 340 pounds; Timken roller bearings on crankshaft front and rear, valve-seat inserts, cylinder-block and crankcase cast separately for economical servicing, and the absence of any grease-cup or oil-fittings on the entire engine. All parts are automatically lubricated from the oiling system. This new engine is recommended by the company for all types of equipment in the oil fields where heavy-duty power is required.

Holder Is Designed to Eliminate Chattering and Climbing

Williams' cutting-off tool holders now are available from J. H. Williams & Co., 75 Spring Street, New York, in two types. A new holder, embodying the spring principle first popularized by Williams' spring threading tool, has been developed for conditions where the use of such a tool will produce the most satisfactory results. Due to the gooseneck design of this holder, the cutter-blade is relieved of excess pressure. Chattering and climbing of the work on the tool, particularly on old or loose lathes, is said to be eliminated.

Both the new spring and the older rigid types of Williams' cutting-off holders feature a positive-cam cutter-lock. A full-bodied cam grips the accurately machined high-speed cutter-blade in such a manner that pressure of work against the blade tends only to tighten the blade in the holder. The holders are supplied in both straight and right-hand offset patterns in four sizes.

Improved Type of String-a-Lite Is Introduced by Sullivan

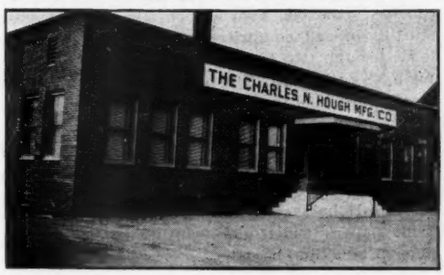
Sullivan Machinery Co., Michigan City, Ind., has announced improvements in String-a-Lite, a moisture-proof lighting cable designed to provide the safety and utility of a permanent installation with the wiring simplicity of a temporary job. String-a-Lite consists of No. 10 two-conductor rubber-covered cord on which moisture-proof end connectors and lamp-socket connectors are integrally molded. Detachable lamp-sockets are of molded rubber or bakelite with prong-type connectors.

The molded rubber socket, a new addition, is so constructed that the lamp-shell, held in place by two small screws, can be easily removed and replaced, helping to reduce the cost of socket replacement to a minimum. Each socket includes one extra shell. Improvements in end-connector and lamp-connector construction are said to have made String-a-Lite trouble-free.

String-a-Lite is easily and quickly installed and taken down. No special wiring or insulation is required. Webs are vulcanized into the cable above each lamp connection from which it can be suspended. String-a-Lite is especially suitable for underground lighting service, construction camps, shaft work, parking lots, loading platforms, in fact wherever temporary lighting is required. It can be made to suit requirements, any length and with any desired lamp spacing.

HOUGH IN NEW OFFICE BUILDING

The new office building of Charles N. Hough Manufacturing Co., Franklin, Pa., is a one-story all-brick structure housing the eight departments of



the company, which has a branch office and warehouse in Tulsa, managed by L. L. Reib. The building, 45 by 65 feet, is air-conditioned and fireproof. The company, which specializes in pumping equipment, was organized in 1901. Mrs. C. B. Hagenbuch is president, Miss Katharine Hough secretary, C. N. Hough treasurer, and O. J. Thompson general manager. The company began as a brass foundry, making oil-well valves and pumping equipment. It introduced the Steelex ball and seat and other specialized pumping units. It employs 50 persons.

Pittsburgh Equitable Develops New Meter for Oil Products

The Pittsburgh Equitable Meter Co., Pittsburgh, Pa., has announced the Pittsburgh rotary meter as an addition to its line of meters for measuring petroleum products. This latest development is designed for fast, accurate bulk-plant and tanktruck service. The meters had two and one-half years of actual service tests before any public announcement was made.

The manufacturer says two factors are responsible for the accuracy of these meters: In the first place, they measure through true positive displacement. Second, they are precision-built to exacting standards.

It is stated that owing to the extremely small frictional resistance of the meter to pipe-line flow, the Pittsburgh rotary can be used successfully on gravity-flow installations where meters previously have not been considered practical. The meter is built in two sizes. The No. 250 is for 2-, 2½- and 3-inch services and has a maximum capacity of 250 gallons per minute. The No. 500 for 3-inch and 4-inch connections has an operating range up to 500 gallons per minute.

Gilmer Opens Branch in Houston

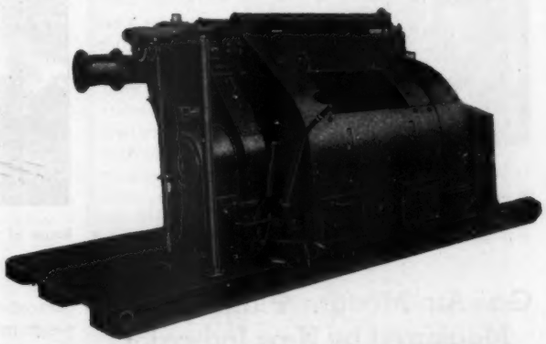
The L. H. Gilmer Co., Philadelphia, Pa., has opened a branch in Houston, Tex., to handle increased business from belt users in the oil fields. The branch, in charge of C. P. Williams, Texas manager for Gilmer, is at 1015 North San Jacinto Street, and it takes the place of the one formerly maintained in Dallas, Tex. V-belts and V-sheaves in fractional horepower and industrial sizes for multiple use, and of Kable Kord belting, are carried in complete stocks for quick delivery. Jobber stocks are kept at 16 convenient points throughout the Mid-Continent and Gulf Coast fields.

BEAUMONT DRAWWORKS MADE WITH OIL-BATH GUARDS

Beaumont Iron Works Co., Beaumont, Tex., is now manufacturing its standard No. 11 and No. 12 unitized drawworks equipped with complete oil-bath guards. Features of the guards include complete closure of chains, sprockets, and clutches, resulting in a saving of oil; dust- and dirt-proof, preventing contamination of lubricant; adequate lubrication, insuring long chain and sprocket life; lubrication of clutches, providing trouble-free action and increased life of shifter parts, which are mounted in bronze bushings.

A roller chain-driven gear pump picks up the oil from the reservoir under the skids and circulates it to the spray nozzles located in each guard. A separate reservoir is supplied above the headboard to lubricate the engine and rotary chains independent of the circulation system. This prevents draining and contaminating the oil in the enclosed system.

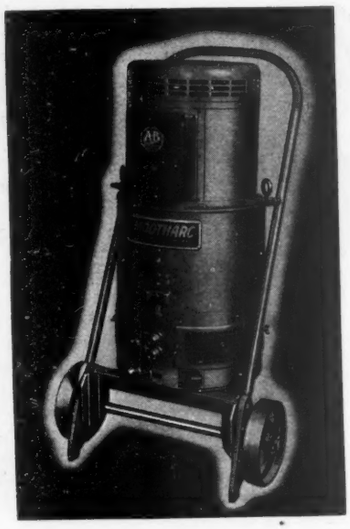
These drawworks are of the heavy-duty type and embody all the improvements brought out on the standard drawworks, including the free-rolling slow sprocket and clutch, which increases shaft strength and eliminates wallowed keyways and twisted shafts; compression brake linkage, providing increased braking area and consequently



lengthened brake-lining life and elimination of the dangerous kick of the old-type brake-lever. Roller bearings and two-step clutches enable the operator to handle these rigs with ease. Complete specifications may be obtained by addressing a request to the manufacturer.

Addition to Its Line of Welders Announced by Harnischfeger

Harnischfeger Corp., 4400 West National Avenue, Milwaukee, Wis., announces a new machine in its line of P&H-Hansen electric arc welders, the



150-ampere vertical-type welder. Designed to occupy a minimum of floor space, this new welder is a highly adaptable machine, available for a wide range of work in welding the lighter-gauge metals, both ferrous and nonferrous. With plug-in type cable receptacles for easy current reversing, and patented single-current control, it sets a new high point in simplicity of welder operation. It is designed, as are all P&H-Hansen welders, for high current uniformity, and is recommended especially for use in the production welding line where smooth, uniform welds are essential.

Furnished in the A.C. drive only, this little machine is less than 4 feet in overall height. An ingenious towing-handle provides easy movement around the shop, and ample stability when raised to form a three-point base. Proper ventilation and cooling are provided through the fresh-air intake at the top and the exhaust at the bottom.

Boax Transferred to "Oilwell"

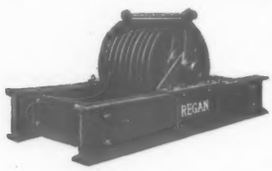
James R. Boax has been transferred from National Tube Co. in Tulsa to Oil Well Supply Co. as sales engineer of tubular products, working out of Houston, Tex. Mr. Boax was born in McKeesport, Pa., in 1904 and comes from a family of craftsmen whose life work has been pipe manufacture, both his father and his grandfather having devoted their lives to this work. After graduating from the University of Syracuse, Mr. Boax took extension work at the University of Pittsburgh and also completed the three-year training course of National Tube Co., after which he assumed the position of field serviceman and sales engineer for National Tube Co.

Gas-Air Mixture Flammability Measured by New Indicator

A new combustible gas indicator for measuring directly the combustibility and explodibility of gas-air mixtures has been developed by the Davis Emergency Equipment Co., Inc., 55 Van Dam Street, New York. In designing this indicator, the object was to produce an instrument that would be as light, compact, and economical as possible without sacrifice of accuracy. The weight, complete with batteries, is only 6 pounds. The instrument panel is 6⅜ by 5⅝ inches. The depth of the case is 3¾ inches. Current is supplied by two standard dry batteries. The indicator is used for measuring the flammability of atmosphere in tanks and other containers of liquids and gases, ship-holds, manholes, conduit systems, and other places where flammable gas-air mixtures may be found.

Light Crownblocks for Drilling in Shallow Fields Announced

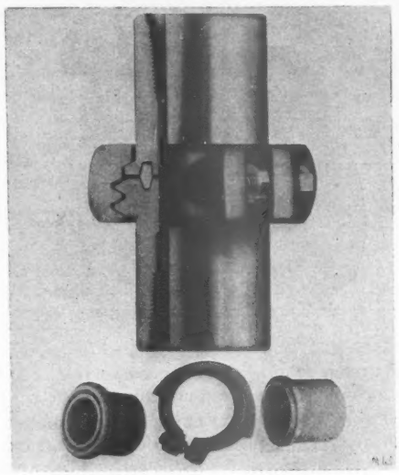
For shallow drilling down to 4,500 feet, engineers of Regan Forge & Engineering Co., San Pedro, Calif., have developed a new straight-line crownblock, known as Light Type F. The four-sheave type is rated at 80 tons and the five-sheave at 100 tons. While 30-inch diameter chrome-alloy sheaves are standard, 36-inch sheaves can be furnished. Two 12-inch 50-pound I-beams, sturdily braced, comprise the frame and carry the load through two cast-steel pillow-blocks supporting a 5¾-inch shaft. The bearings are S.A.E. 52100 steel, fully heat-treated and ground to precision limits.



A 12-page booklet prepared by Keuffel & Esser Co., Hoboken, N. J., tells how Series 60 blueprint papers widen the printing range and reduce production hazards.

Designed for Lines Subject to Vibration or High Pressure

A new malleable-iron high-pressure pipe union for use in oil fields or wherever pipe lines are subject to high pressure or vibration has been developed by the Red-Rex Corp., Houston, Tex.



Design objectives for pipe unions of this type are said to have been realized in that they are leak-proof, highly resistant to corrosion, withstand vibration, and are nonporous. The union allows for expansion and contraction caused by temperature changes, and it may be installed and tightened by action of a single screw. Each union is tested to 8,000 pounds pressure and since working pressures generally do not exceed 3,000 pounds, the extra strength provides a large margin of safety.

YOUNGSTOWN SHEET & TUBE'S NEW MILL IN OPERATION

A new mill for making 4½- to 14-inch seamless pipe, the first large seamless-tube mill built in this country in over seven years, has been put into operation at the Youngstown, Ohio, plant of the Youngstown Sheet & Tube Co. The mill is part of a general development and improvement program just completed in the company's seamless-pipe division which included installation of a 35-inch rounds mill for rolling round pipe billets; two huge "peelers," which automatically "skin" steel billets to remove surface defects; two 50-ton-per-hour billet-heating furnaces, the largest of their kind ever built, and two pipe-piercing mills which are said to be masterpieces of engineering.

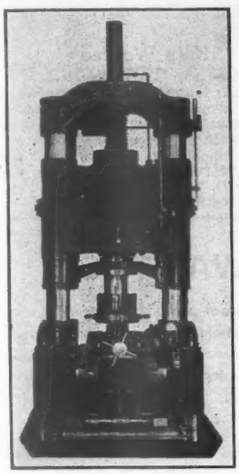
Latest developments in design are incorporated in all the equipment, from blooming mill to automatic pipe-length recorders. The new mill, replacing one built only 12 years ago, has a rated capacity of 300,000 tons a pear.

Route of the white-hot steel is from the furnaces (right rear) through the No. 1 piercer (right center) across and down the conveyor tables (center) and through the No. 2 piercer (left foreground)

The two piercing mills are identical units, powered by 5,000-horsepower motors. Construction and rolling principles used in modern continuous strip mills have been applied in their design. The roll face is different from the conventional piercing mill, permitting a different distribution of the actual working of the steel to give a better product. Both inlets and outlets are longer, to permit the piercing of maximum lengths.

Device for Tapping Couplings Is Introduced by Stamets

In the new Stamets machine for tapping oil-field pipe-couplings, announced by William K. Stamets, Pittsburgh, Pa., the upper structure is supported by two ground cylindrical columns which serve as ways on which the head travels. The head has rapid traverse in both directions and the feed for tapping is obtained by means of an accurately ground lead screw having a coarse thread. The lead screw is located directly in line, and in effect forms a rigid column with the spindle. The machine is provided with a free-floating chuck for holding the coupling to be tapped, the couplings having been accurately bored and faced.

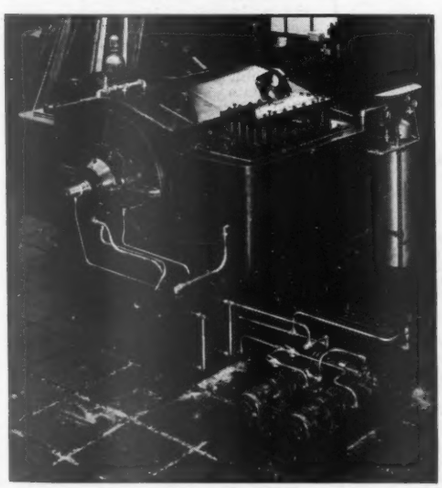


In chucking, the finished face of the coupling is placed in the machine on a surface plate which is normal to the center line of the spindle. The chuck then is advanced by means of an air cylinder until the coupling is approximately in line with the tap. As the tap enters, the coupling is free to float into alignment. After one end of the coupling has been tapped the chuck retreats and the coupling is ejected and reversed in the chuck. After that the operation is automatic, including the tripping and resetting of the tap.

Accuracy of lead in the tapped coupling can be maintained with an error not exceeding .001 inch per inch, according to the manufacturer. A lead compensator has been developed for greater lead accuracy. The machine can be furnished with a floating chuck for holding the coupling on the finished ends only, instead of on the outside diameter.

Unusual Induction-Motor Type Distinguishes G.E. Motors

The first two motors of their type and construction, involving an unusual induction-motor design,



have been constructed by General Electric Co. for oil-refinery service. These two-pole, 50-cycle induction motors, rated 1,000 horsepower at 3,000 r.p.m., are being installed by C. F. Braun & Co. for the Richfield Oil Co. refinery at Watson, Calif. As such size of motor is beyond the range of labeled explosion-proof Class I Group D design, these motors are provided with a closed-circuit system of ventilation incorporating surface air-coolers for removing heat, as well as a valve arrangement for continuously injecting a small amount of inert gas. These features, together with tight enclosures and special seals, provide the operator with a complete arrangement for maintaining a noninflammable atmosphere, slightly above atmospheric pressure, within the motor.

The closed-circuit cooling system, which is unusual for high-speed induction motors, involves directional ventilation. Propeller-type fans designed in the company's research laboratory force the inert mixture over the motor windings through ducts, and thence through surface coolers which extract the heat before the mixture is circulated again.

A forced-feed lubricating system furnishes oil to the bearings under pressure by means of two pumps. These pumps operate continuously to maintain a liquid seal at the bearings at all times.

Here and There With Men Who Manufacture Equipment

M. N. Dannenbaum Co. has been appointed sales representative for the Struthers-Wells Division of Struthers-Wells-Titusville Corp. in eastern Texas. Headquarters are at 202 Petroleum Building, Houston, Tex.

James A. Riordan Co., whose president, Ed. Johnson, is well known in the West Coast petroleum industry, has been appointed exclusive representative on the Pacific Coast for Wheeling Machine Products Co. and National Coupling & Fitting Co.

General Cable Corp. has moved it Chicago office from 20 North Wacker Drive to 111 North Canal Street. The consolidation of office and warehouse provides better facilities for prompt service.

Lucey Products Corp., Tulsa, has been appointed distributor of Gilmer V-belts and V-sheaves for the L. H. Gilmer Co., Philadelphia, Pa. Lucey carries stocks in Oklahoma City and Stonewall, Okla.; Hutchinson, Kans.; Odessa and Wichita Falls, Tex.

Acquires Trimble & Lutz Supply

Wheeling Machine Products Co., Wheeling, W. Va., has acquired Trimble & Lutz Supply Co., of that city. Wheeling Machine Products Co., which manufactures seamless pipe couplings and merchant nipples, will operate the other company as a subsidiary. Trimble & Lutz Supply Co., which has been in continuous operation for 58 years, owns a modern four-story building with a frontage of 180 feet. E. W. Krause, president of Wheeling Machine Products Co., said an expansion program would begin.

Air Is Conditioned by Machine Which Filters Out the Dust

A machine which conditions air by filtering out dirt particles and is said to remove approximately 95 per cent of the dirt from the air in the vicinity of grinding, welding, and other shop operations, is announced by the Lincoln Electric Co., Cleveland, Ohio. The machine also draws smoke and heat away from the work, thus contributing to the efficiency of welders and to the improvement of shop conditions. It can be adapted for blowing smoke away where such operation is desired.

The machine, called the "Linconditioner," has been developed to provide workshops with a more economical solution of the problem of cleaning shop air than that obtained with the conventional shop ventilating system. It removes smoke and

dirt at their source rather than after they have combined with large quantities of air. This requires less power. Also, since no air is taken in or blown to the outside of the building, the new machine conserves plant heat.

The Linconditioner consists of a motor-driven fan, which produces suction through a flexible metal tube. The fan draws the air through the tube and exhausts it in a filter located in the periphery of the power unit. The tube is supported by a welded steel arm and spring arrangement, so that the nozzle can be shifted to any desired spot within the operating radius of the tubing.

When the Linconditioner is used for removing and filtering the air, a rubber cap is kept over the blower outlet. When used for blowing, the rubber cap is removed and the flexible tube is placed in the blower outlet. The fan is powered by a one-half horsepower, 2- or 3-phase, 60-cycle motor.

Chart Tells About Deep Wells

Patterson-Ballagh Corp., 1900 East Sixty-fifth Street, Los Angeles, Calif., has published a wall chart bringing up to date the important data on wells of the world drilling deeper than 10,000 feet. The chart gives information concerning the Con-

tinental Oil Co.'s record-breaking well, including details of its production, casing, etc. Copies of this chart will be mailed free to those requesting them from the company.

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PATENTS obtained — inventions developed — working drawings — engineering advice. Mid-Continent Engineering Company, E. H. Waldrop, Shawnee, Okla.

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LEASES, Royalties and drilling blocks throughout present hot play southern Arkansas. El Dorado Oil Exchange, Garrett Hotel Building, El Dorado, Arkansas.

I HAVE 2 Block of Leases, 410 Acres in 3 miles of producing well in Wayne County, Illinois, and a large Block in Hamilton County, Illinois. Will assign for reasonable price and drilling committment. George W. Hogan, McLeansboro, Illinois.

NEW MEXICO Oil Leases for sale, Wholesale. Inquiries invited. Write, Box 507, Las Vegas, New Mexico.

PROVEN offset lease in Oklahoma City field. Will sell $7,500 or consider drilling contract. R. Z. Glass, 1901 Commerce Street, Dallas, Texas.

HAVE SOLID block oil leases, in Massac County, Illinois, on structure. Sell or make drilling contract. Low rentals. J. N. Lawler, 601 S. Summit, Girard, Kansas.

New Mexico OIL LEASES WHOLESALE 40 acres at a time.
Roy G. Barton, Clovis, New Mexico.

LEASES—East Texas, La., South Ark. 20 acres up, dollar acre up. Owners—Address Attorney, Box 1122, Little Rock, Ark.

DRILLING deal wanted. 40,000 A. in So. Ill. in and around production area. Illinois Minerals Co., Cairo, Illinois.

Leases and Drilling Blocks

SUBSURFACE HIGH

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Have favorable subsurface geological report on this area from H. D. Easton, Shreveport, Louisiana, and J. V. Howell, formerly with Marland Oil Company.

From logs of wells heretofore drilled the following producing horizons should be encountered in this area:

Nacatoch	1750 below sea level
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Will give free shooting rights for geophysical exploration and oil and gas lease on all necessary acreage in event well is drilled, at cost of securing leases.

If interested write or wire C. E. Harris, El Dorado, Arkansas.

Tex., La., Okla., Ark., Kas., N. Mex., producing and potential royalties, leases, drilling blocks, lands, bought-sold. American Investment Co., Houston.

I OWN 3,000 acres free in N. Pittsburg and Atoka Cos., Okla. 40 to 1000 A. tracts. No trades. Cash sale, lease or royalty, $5 to $25 per A. Townsite on 2 RRs. near production. J. E. Cavanagh, Baker, Ore.

NEED money quick to complete Oklahoma well near shallow oil; will sacrifice one to four close-in 40-acre leases, $5 per acre and give one-sixth interest in the well with each 40-acre tract. Address Box J-410, The Oil and Gas Journal, Tulsa, Oklahoma.

LEASES—ROYALTY. Few small tracts around the Dobbs Oil Co.'s Ordovician Wildcat Eastland County block. Low price. E. CROFT, Proctor, Texas.

FOR SALE—Block 480 acres near St. Paul, Kansas, center of Peru Oil Pool, 180 ft. deep, 26 ft. sand, 20 ft. saturated. Nine wells eleven years old now pumping 4 bbls. per day. Seven shale gas wells 250 ft. on same acreage. Good oil and gas markets. All titles and taxes clear. Cash price all equipment, leases and complete possession $4500. No brokers. Don't take my time if you don't mean business. Wayne Yount, Ottawa, Kansas.

OWNER of Section of land fourteen miles northeast of Macoun, Sackatchewan, on which there is believed to be oil and gas, wishes to lease or sell land to someone who will drill for gas and oil. Write to Mrs. Blanche Gilbraith, Geneseo, Ill.

Leases and Drilling Blocks

KANSAS Oil Leases, Royalties and Drilling Blocks. Lease Exchange, R. No. 3, N. Topeka, Kansas.

HENDERSON COUNTY. Offset brought $200 an acre. Will sell 10 acres southwest new Texas well $100 an acre cash. North Bigbee, 3213 Drexel Drive, Dallas, Tex.

HAVE 5-year oil lease on 15,000 acres solid block Sioux County, Nebraska. Will sub-lease to right party. Near active drilling in same county. W. R. PRESTON, Morrill, Nebraska.

50 SELECT buyers royalties or lease $1.00. State choice and locality. Oil Industry Mailing List Co., Tulsa Loan Building, Tulsa, Oklahoma.

BLOCKED acreage, proven structure, shallow drilling, will sell or lease any part of 5,000 acres. Odgen and Davis, 219 N. Wolcott, Casper, Wyoming.

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7680 ACRE stock ranch, in Lincoln County, New Mexico. 640 acres Patented land in center, and 11 section State Leased land at 3c per acre, good and expensive improvements, 400 head of high grade Herford cattle, fenced and cross fenced, abundance of water. $30,000.00. Terms. All goes. Wm. M. Haver, 2832 East Elm St., Wichita, Kansas.

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CHIEF Estimating Engineer employed by major oil company, graduate engineer, 39. Considerable practical large construction management background. Specialist coordinating construction operations with estimating department. Good reason for desiring change. Minimum starting salary $350.00 per month. Address Box J-402, The Oil and Gas Journal, Tulsa, Oklahoma.

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REFINERY ENGINEER: 5 years' experience including laboratory supervisor: assistant plant superintendent; extensive road oil manufacturing; research and control; preliminary refinery operations in new plant. Good references. Circumstances necessitate change regardless of remuneration. Address Box J-413, The Oil and Gas Journal, Tulsa, Okla.

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PATENT: Holder of Foreign Hydraulic Brake Fluid Patent wishes to hear from Manufacturers interested to take over American rights.

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